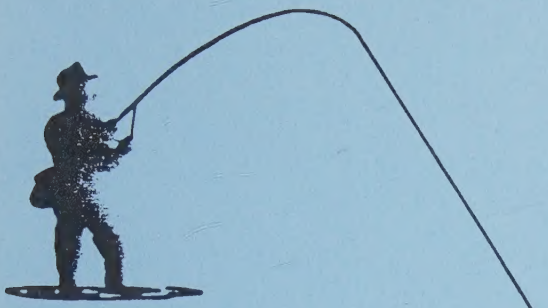
28(1)

4/13/83 28(1)



SPORT FISHERY ABSTRACTS

LIBRARY
NATIONAL MARINE FISHERIES SERVICE
HONOLULU LABORATORY
P. O. BOX 3830
HONOLULU, HAWAII 96812

Vol. 28, No. 1, 1983

DEPARTMENT OF THE INTERIOR
U. S. FISH AND WILDLIFE SERVICE

UNITED STATES DEPARTMENT OF THE INTERIOR

SPORT FISHERY ABSTRACTS

Roger Schoumacher, Editor
Terry N. Sexson, Assistant Editor

Editorial Office
U.S. Fish and Wildlife Service
Aylesworth Hall, CSU
Fort Collins, Colorado 80523

Sport Fishery Abstracts is intended to furnish fishery biologists with abstracts of current literature in sport fishery research and management.

One volume, consisting of four numbers, is issued each year. Each number contains separate Author, Geographic, and Taxonomic indexes, and the final number of each volume contains cumulative Author, Geographic, Taxonomic, and Subject indexes, and a list of publications screened. Authors who publish in journals not screened for *Sport Fishery Abstracts*, and who would like their publications included, should submit abstracts to the Editor.

The U.S. Fish and Wildlife Service assumes no responsibility for the accuracy of material from outside sources, and can only supply copies of articles written and published by the U.S. Fish and Wildlife Service.

SPORT FISHERY ABSTRACTS

An abstracting service for fishery research and management

Volume 28(1) 1983

CONTENTS

AQUATIC PLANTS AND THEIR CONTROL..... 1

CULTURE AND PROPAGATION

General Fish Culture..... 1
Trout and Salmon Culture..... 1
Warmwater Culture..... 2
Mariculture..... 4
Feeds, Feeding and Nutrition..... 4
Transporting Fish..... 6
Miscellaneous Culture Techniques and Equipment..... 7

LIMNOLOGY AND OCEANOGRAPHY

Chemical..... 8
Benthos..... 8
Plankton..... 8
Primary Production..... 9

MORPHOLOGY, PHYSIOLOGY, GENETICS AND BEHAVIOR

Morphology..... 9
Physiology..... 15
Genetics, Variation Studies, Hybridization..... 25
Behavior..... 27

NATURAL HISTORY

Life Histories - General Works..... 30
Population Studies - Production, Standing Crop, Recruitment. 33
Spawning Habits and Movements, Sex Ratios, Fecundity, etc... 36
Movements, Seasonal and Depth Distribution, etc..... 40
Foods and Feeding..... 42
Age and Growth..... 49
Geographical Distribution, Fish surveys, etc..... 52
Abundance, Factors of; Survival and Mortality..... 55
Identification, Keys, Classification..... 56

PARASITES AND DISEASES

General..... 59
Bacterial..... 59
Fungal..... 61
Protozoan..... 61
Viral..... 62
Other..... 63

POLLUTION AND TOXICOLOGY

Pollution..... 66
Toxicology; Bioassays..... 67

RESEARCH AND MANAGEMENT

General..... 72
Habitat Alteration..... 72
Harvest, Creel Census, etc..... 73
Marking and Tagging..... 74
Stocking and Introductions..... 74
Fishing Gear and Techniques..... 75
Fertilization of Water and Soil..... 75
Fishways, Fish Passage through Dams, etc..... 76
Mathematical, Statistical Methods and Modeling..... 77
Lake Management and Research..... 78
River and Stream Management and Research..... 79
Farm Pond and Small Impoundment Management and Research..... 81
Large Impoundment Management and Research..... 81
Estuary Management and Research..... 81
Marine Management and Research..... 82
Reviews, Bibliographies, etc..... 84
Watershed Management..... 84

AUTHOR INDEX (Salmon)..... 85
GEOGRAPHIC INDEX (Yellow)..... 103
SYSTEMATIC INDEX (Blue)..... 107

AVAILABILITY OF REPRINTS AND PUBLICATIONS

SPORT FISHERY ABSTRACTS does not distribute any of the papers abstracted herein, nor can the editor of SPORT FISHERY ABSTRACTS undertake to obtain copies of these papers for anyone. A reprint of an article published in a journal may be available from the author, from the organization with which the author is affiliated, or from the publisher of the journal in which the article appeared. When an author's address is know, it is shown in square brackets following the citation. Addresses of most wildlife organizations can be obtained from the CONSERVATION DIRECTORY, an annual publication available from the National Wildlife Federation, 1412 16th Street, N.W., Washington, D. C. 20036, at a price of $6.00 per copy plus $1.55 postage and handling. This directory lists more than 900 agencies and organizations concerned with natural resources use.

AQUATIC PLANTS AND THEIR CONTROL

83-000001 Harrison, P. G. and R. E. Bigley. THE RECENT INTRODUCTION OF THE SEAGRASS *ZOSTERA JAPONICA* ASCHERS. AND GRAEBN. TO THE PACIFIC COAST OF NORTH AMERICA. *Can. J. Fish. Aquatic Sci.* 39(12):1642-1648. Dec. 1982. In English with French summ. SFA 28(1)
[Dep. Bot., Univ. British Columbia, Vancouver, BC V6T 2B1, Canada]

83-000002 Shireman, J. V. COST ANALYSIS OF AQUATIC WEED CONTROL: FISH VERSUS CHEMICALS IN A FLORIDA LAKE. *Prog. Fish-Cult.* 44(4):199-200. Oct. 1982. SFA 28(1)
[Cent. Aquatic Weeds, Univ. Fla., Gainesville 32611]

83-000003 Wurtsbaugh, W. A. and A. J. Horne. EFFECTS OF COPPER ON NITROGEN FIXATION AND GROWTH OF BLUE-GREEN ALGAE IN NATURAL PLANKTON ASSOCIATIONS. *Can. J. Fish. Aquatic Sci.* 39(12):1636-1641. Dec. 1982. In English with French summ. SFA 28(1)
[Div. Environ. Stud., Univ. Calif., Davis 95616]

GENERAL FISH CULTURE

83-000004 Ackefors, H. AQUACULTURE: A NEW INDUSTRY IN SWEDEN. *Ambio* 11(6):362-365. 1982. SFA 28(1)
[Swed. Counc. Plan. Coord. Res., Stockholm, Sweden]

83-000005 Downey, P. C. A SYSTEMS APPROACH TO AQUACULTURE MANAGEMENT: A PRODUCTION FORECASTING MODEL. *Ph.D. dissertation, Univ. Idaho* 293p. 1982. From Diss. Abstr. Int. B Sci. Eng. 43(5):1314. Nov. 1982. SFA 28(1)

83-000006 Mann, J. A.; V. J. Catrow; L. C. McKenzie and F. V. Engle. FISH CULTURE. AN ANNOTATED BIBLIOGRAPHY OF PUBLICATIONS OF THE NATIONAL FISHERIES CENTER--LEETOWN 1972-1980. *U.S. Fish Wildl. Serv.* FWS/NFC-L/82-1. 124p. Aug. 1982. SFA 28(1)
[Tech. Inf. Serv, Box 700, Kearneysville, WV 25430]

83-000007 Vanhaecke, P. and P. Sorgeloos. INTERNATIONAL STUDY ON *ARTEMIA*. XIX. HATCHING DATA FOR TEN COMMERCIAL SOURCES OF BRINE SHRIMP CYSTS AND RE-EVALUATION OF THE "HATCHING EFFICIENCY" CONCEPT. *Aquaculture* 30(1-4):43-52. Jan. 1983. SFA 28(1)
[Artemia Ref. Center, State Univ. Ghent, J. Plateaustraat 22, B-9000 Ghent, Belgium]

TROUT AND SALMON CULTURE

83-000008 Fuss, H. J. and C. Johnson. QUALITY OF CHUM SALMON FRY IMPROVED BY INCUBATION OVER ARTIFICIAL SUBSTRATES. *Prog. Fish-Cult.* 44(4):170-172. Oct. 1982. SFA 28(1)
[Wash. Dep. Fish., 115 Gen. Admin. Bldg., Olympia 98504]

TROUT AND SALMON CULTURE (CONTINUED)

83-000009 Marrocco, A. RISULTATO DEL'INCROCIO TRA DUE CEPPI DI TROTE IRIDEE (*SALMO GAIRDNERI*) A DIVERSA STAGIONE DI FREGOLA. [CROSSBRED BETWEEN TWO STRAINS OF RAINBOW TROUT (*SALMO GAIRDNERI*) WITH A DIFFERENT SPAWNING SEASON.] *Riv. It. Piscic. Ittiop.* 17(3):120-123. 1982. In Italian with English summ. SFA 28(1)
[Troticolt. Leonardi, 38070 Preore (Trento), Italy]

83-000010 Moring, J. R. FIN EROSION AND CULTURE-RELATED INJURIES OF CHINOOK SALMON RAISED IN FLOATING NET PENS. *Prog. Fish-Cult.* 44(4):189-191. Oct. 1982. SFA 28(1)
[Me. Coop. Fish. Unit, Dep. Zool., Univ. Me., Orono 04469]

WARMWATER CULTURE

83-000011 Central Luzon State University Freshwater Aquaculture Center. PROGRESS REPORT OF THE FRESHWATER AQUACULTURE CENTER. *Cent. Luzon State Univ. Freshwater Aquacult. Cent. Tech. Rep.* No. 18. v + 44p. 1982. SFA 28(1)
[Muñoz, Nueva Ecija 2320, Philippines]

83-000012 Central Luzon State Univ. Freshwater Aquaculture Center. PROGRESS REPORT OF THE FRESHWATER AQUACULTURE CENTER. *Cent. Luzon State Univ. Freshwater Aquacult. Cent. Tech Rep.* No. 19. iv + 78p. 1982. SFA 28(1)
[Muñoz, Nueva Ecija 2320, Philippines]

83-000013 Crim, L. W.; D. M. Evans and B. H. Vickery. MANIPULATION OF THE SEASONAL REPRODUCTIVE CYCLE OF THE LANDLOCKED ATLANTIC SALMON (*SALMO SALAR*) BY LHRH ANALOGUES ADMINISTERED AT VARIOUS STAGES OF GONADAL DEVELOPMENT. *Can. J. Fish. Aquatic Sci.* 40(1):61-67. Jan. 1983. In English with French summ. SFA 28(1)
[Mar. Sci. Res. Lab., Memorial Univ. Newfoundland, St. John's NF A1C 5S7, Canada]

83-000014 Hamman, R. L. INDUCED SPAWNING AND CULTURE OF BONYTAIL CHUB. *Prog. Fish-Cult.* 44(4):201-203. Oct. 1982. SFA 28(1)
[U.S. FWS, Willow Beach Natl. Fish Hatchery, P.O. Box 757, Boulder City, NV 89005]

83-000015 Hamman, R. L. SPAWNING AND CULTURE OF HUMPBACK CHUB. *Prog. Fish-Cult.* 44(4):213-216. Oct. 1982. SFA 28(1)
[U.S. FWS, Willow Beach Natl. Fish Hatchery, P.O. Box 757, Boulder City, NV 89005]

83-000016 Klinger, H.; H. Delventhal and V. Hilge. WATER QUALITY AND STOCKING DENSITY AS STRESSORS OF CHANNEL CATFISH (*ICTALURUS PUNCTATUS* RAF.). *Aquaculture* 30(1-4):263-272. Jan. 1983. SFA 28(1)
[Inst. Hydrobiol. Fischereiwiss., Univ. Hamburg, Olbersweg. 24, 2000 Hamburg 50, West Germany] The influences of heated recirculated water and well water on three stocking densities of channel catfish (*Ictalurus punctatus* Raf.) were compared, based on several physiological and hematological parameters. Controls were kept in well water only. The leucocyte count of fish kept in well water generally decreased, and their

WARMWATER CULTURE (CONTINUED)

83-000016 CONTINUED thrombocyte, lymphocyte and granulocyte counts were lower at higher stocking densities. In addition, a slight hemoconcentration was observed. The fish kept in recirculated water showed a decrease only in thrombocyte count. Plasma cortisol and blood glucose did not change and in all groups were at a level characteristic of resting fish. In contrast, the blood lactate levels were always high. This may have been caused by the anesthetization. The alterations found are regarded as symptoms of the "general adaptation syndrome" induced by the stocking rates. High lymphocyte and granulocyte counts among the fish in reused water are signs of local adaptations to reduced water quality.

83-000017 Li, S. and J. A. Mathias. CAUSES OF HIGH MORTALITY AMONG CULTURED LARVAL WALLEYES. *Trans. Am. Fish. Soc.* 111(6):710-721. Nov. 1982. SFA 28(1)

[J. A. Mathias: Freshwater Inst., 501 University Crescent, Winnipeg, MB R3T 2N6, Canada]

83-000018 Lovell, R. T. NEW OFF-FLAVORS IN POND-CULTURED CHANNEL CATFISH. *Aquaculture* 30(1-4):329-334. Jan. 1983. SFA 28(1)

[Dep. Fish. Allied Aquacult., Auburn Univ., Auburn, AL 36849] A sample from every group of off-flavored channel catfish (*Ictalurus punctatus*) delivered from culture ponds to a commercial processing plant over a 60-day period during the spring-summer growing season was collected for flavor analysis by trained sensory evalutors. Earthy-musty (muddy) type flavors have previously been recognized as the major cause of off-flavors in pond-cultured fish, but in this study other flavors predominated in 75% of the samples. A flavor defined as "sewage" was the dominant flavor in 25% of the samples, "stale" was dominant in 21%, "rancid" was dominant in 8%, and "metallic", "moldy", "petroluem", and "weedy" were dominant in others. Recognizable flavors in addition to the dominant flavor were found in most samples. The earthy-musty flavor was the most distinct and easily recognized and received the lowest (most intense) sensory score. Sewage, stale, and rancid flavors were the most subtle and harder to identify, and received higher (less intense) sensory scores. These off-flavor descriptions should be useful in refining sensory evaluation procedures and developing objective methods for measuring off-flavor in cultured fish.

83-000019 Melotti, P. ALEVAMENTO E COMMERCIALIZZAZIONE DEL CARASSIO DORATO (*CARASSIUS AURATUS* L.) IN ITALIA. [PRODUCTION AND MARKETING OF GOLDFISH (*CARASSIUS AURATUS* L.) IN ITALY.] *Riv. It. Piscic. Ittiop.* 17(3):91-102. 1982. In Italian with English summ. SFA 28(1)

[Piscicolt. Ist. Zoocolt., Univ. Bologna, Italy]

83-000020 Wilson, J. L. and L. R. Hilton. EFFECTS OF TILAPIA DENSITIES ON GROWTH OF CHANNEL CATFISH. *Prog. Fish-Cult.* 44(4):207-209. Oct. 1982. SFA 28(1)

[Dep. For. Fish. Wildl., Univ. Tenn., P.O. Box 1071, Knoxville 37901]

83-000021 Zerunian, S. IL TRIOTTO (*RUTILUS RUBILIO*): BIOLOGIA E POSSIBILITÀ DI ALLEVAMENTO. [THE ITALIAN ROACH (*RUTILUS RUBILIO*): BIOLOGY AND BREEDING POTENTIAL.] *Riv. It. Piscic. Ittiop.* 17(3):105-111. 1982. In Italian with English summ. SFA 28(1)

[Coop. Ecol. Anim. Appl., Contrada Ponte Vet., 04010 Maenze (LT), Italy]

MARICULTURE

83-000022 Barcelona, M. J.; L. C. Cummings; S. H. Lieberman; H. S. Fastenau and W. J. North. MARINE FARMING THE COASTAL ZONE: CHEMICAL AND HYDROGRAPHIC CONSIDERATIONS. *Calif. Coop. Oceanic Fish. Invest.* 23:180-187. Oct. 1982. SFA 28(1)
[Ill. State Water Surv., Box 5050, Station A, Champaign 61820]

83-000023 Kaya, C. M.; A. E. Dizon; S. D. Hendrix; T. K. Kazama and M. K. K. Queenth. RAPID AND SPONTANEOUS MATURATION, OVULATION, AND SPAWNING OF OVA BY NEWLY CAPTURED SKIPJACK TUNA, *KATSUWONUS PELAMIS*. *NOAA Fish. Bull.* 80(2):393-396. Apr. 1982. SFA 28(1)
[Dep. Biol., Mont. State Univ., Bozeman 59717]

83-000024 Kraul, S. RESULTS AND HYPOTHESES FOR THE PROPAGATION OF THE GREY MULLET, *MUGIL CEPHALUS* L. *Aquaculture* 30(1-4):273-284. Jan. 1983. SFA 28(1)
[Waikiki Aquarium, 2777 Kalakaua Ave., Honolulu, HI 96815] An estimated 58 000 juvenile (0.3-8 g weight and 30-90 mm total length) grey mullet, *Mugil cephalus*, were propagated in 1980 for livebait trials for tuna fishing. High hatchery yields were obtained through the control of incident sunlight, feeding with cultured copepods, and frequent, vigorous cleaning of tanks. The best yields were about 1 kg/m^3 per 4-month cycle. Growth data, survival, and yields are discussed, and hypotheses for the improved results are proposed.

83-000025 Minton, R. V.; J. P. Hawke and W. M. Tatum. HORMONE INDUCED SPAWNING OF RED SNAPPER, *LUTJANUS CAMPECHANUS*. *Aquaculture* 30(1-4):363-368. Jan. 1983. SFA 28(1)
[Ala. Dep. Conserv. Nat. Resour., Mar. Resour. Div., P.O. Drawer 458, Gulf Shores 36542] Red snapper, *Lutjanus campechanus*, were induced to ovulate following injections of Human Chorionic Gonadotopin (HCG). Females were injected initially with 1.1 IU/g body weight. When subsequent injections were necessary, 0.55IU/g of body weight was used. Ovulation occurred between 42 and 56 h following injection. Eggs were wet stripped and fertilized simultaneously with sperm from two males. Initial mitosis was detected 30 min post fertilization. Hatching occurred in 20 h at 27°C.

FEEDS, FEEDING, AND NUTRITION

83-000026 Appler, H. N. and K. Jauncey. THE UTILIZATION OF A FILAMENTOUS GREEN ALGA (*CLADOPHORA GLOMERATA* (L) KUTZIN) AS A PROTEIN SOURCE IN PELLETED FEEDS FOR *SAROTHERODON* (TILAPIA) *NILOTICUS* FINGERLINGS. *Aquaculture* 30(1-4):21-30. Jan. 1983. SFA 28(1)
[Inst. Aquacult., Univ. Stirling, Stirling FK9 4LA, England]

83-000027 Cowey, C. B.; J. W. Adron and A. Youngson. THE VITAMIN E REQUIREMENT OF RAINBOW TROUT (*SALMO GAIRDNERI*) GIVEN DIETS CONTAINING POLYUNSATURATED FATTY ACIDS DERIVED FROM FISH OIL. *Aquaculture* 30(1-4):85-93. Jan. 1983. SFA 28(1)
[NERC Inst. Mar. Biochem., St. Fittick's Rd., Aberdeen AB1 3RA, Scotland]

FEEDS, FEEDING, AND NUTRITION (CONTINUED)

83-000028 Dabrowski, K. and M. Rusiecki. CONTENT OF TOTAL AND FREE AMINO ACIDS IN ZOOPLANKTONIC FOOD OF FISH LARVAE. *Aquaculture* 30(1-4):31-42. Jan. 1983. SFA 28(1)
[Inst. Ichthyobiol. Fish., Inst. Food Chem., Acad. Agric. Technol., 10-957 Olsztyn-Kortowo, Poland]

83-000029 Dean, J. C.; L. A. Helfrich and L. A. Nielsen. EVALUATION OF SEAFOOD PROCESSING WASTES AS A PROTEIN SOURCE IN CATFISH DIETS. *Va. J. Sci.* 33(3):102. 1982. Abstract only. SFA 28(1)
[Dep. Fish. Wildl. Sci., VPI&SU, Blacksburg, VA 24061]

83-000030 Engle, C. R. GROWTH OF FED AND UNFED BIGHEAD CARP IN CAGES AT TWO STOCKING DENSITIES. *Prog. Fish-Cult.* 44(4):216-217. Oct. 1982. SFA 28(1)
[Sch. Ecol., Univ. Cent. Am., Apt. 69, Managua, Nicaragua]

83-000031 Fagerlund, U. H. M.; D. A. Higgs; J. R. McBride; M. D. Plotnikoff, B. S. Dosanjh and J. R. Markert. IMPLICATIONS OF VARYING DIETARY PROTEIN, LIPID AND 17α-METHYLTESTOSTERONE CONTENT ON GROWTH AND UTILIZATION OF PROTEIN AND ENERGY IN JUVENILE COHO SALMON (*ONCORHYNCHUS KISUTCH*). *Aquaculture* 30(1-4):109-124. Jan. 1983. SFA 28(1)
[Dep. Fish. Oceans, 4160 Marine Dr., West Vancouver, BC V7V 1N6, Canada]

83-000032 Gropp, J.; A. Schwalb-Bühling; H. Koops and K. Tiews. ON THE PROTEIN-SPARING EFFECT OF DIETARY LIPIDS IN PELLET FEEDS FOR RAINBOW TROUT (*SALMO GAIRDNERI*). *Arch. Fischereiwiss.* 33(1-2):79-89. Nov. 1982. SFA 28(1)
[H. Koops: Inst. Küsten- Binnenfisc. Bundesforsch. Fisch., Hamburg, West Germany]

83-000033 Hilton, J. W.; J. L. Atkinson and S. J. Slinger. EFFECT OF INCREASED DIETARY FIBER ON THE GROWTH OF RAINBOW TROUT (*SALMO GAIRDNERI*). *Can. J. Fish. Aquatic Sci.* 40(1):81-85. Jan. 1983. In English with French summ. SFA 28(1)
[Dep. Nutr., Univ. Guelph, Guelph, ON N1G 2W1, Canada]

83-000034 Kastelein, P. SURVIVAL AND GROWTH OF ELVERS (*ANGUILLA ANGUILLA* L.) REARED ON AN EXPANDED GRANULATED DIET. *Aquaculture* 30(1-4):155-172. Jan. 1983. SFA 28(1)
[Fish Farm Development Ltd., Stronachullin Fish Culture Stn., Stronachullin, Ardrishaig, Argyll PA30 8ET, Scotland] The suitability of a dry commercial expanded diet for the early rearing of newly-caught glass eels without weaning was investigated. During a 104-day period, suitable feed particle sizes were determined for various sizes of fish, and growth and survival monitored. All mortalities, which totalled 28% of the initial population, occurred during the early stages of the experiment, suggesting that they were fish which either did not accept, or were unable to utilise, the diet given. No cannibalism was seen at any time. Overall growth rate and food conversion averaged 2.03% of bodyweight/day and 2.1 respectively. Selected, faster growing fish (35% of the stock) showed an average growth rate of 3.41%/day and a food conversion of 1.47. The differences between the results obtained with the diet used and previously published data are discussed.

FEEDS, FEEDING, AND NUTRITION (CONTINUED)

83-000035 Knights, B. FOOD PARTICLE-SIZE PREFERENCES AND FEEDING BEHAVIOUR IN WARMWATER AQUACULTURE OF EUROPEAN EEL, *ANGUILLA ANGUILLA* (L.). *Aquaculture* 30(1-4):173-190. Jan. 1983. SFA 28(1)

[Sch. Eng. Sci., Polytech. Cent. Lond., London W1M 8JS, England] European eels [*Anguilla anguilla* (L.)] from 0.2g (elvers) to 88 g were fed commercial granular and pelleted feeds of different diameters in fresh-water at 25°C in laboratory systems. Efficiency of location and capture were assessed by measuring consumption time and, where appropriate, disintegration time of particles. Feeding behaviour was analyzed and the number of sensory location behaviours (visual and contact), ingestion behaviours (inertial suction and snaps), and rejections were calculated for each particle size. The average length of time particles were retained in the mouth before swallowing or rejection was also calculated. Elvers and fingerlings below 10-15g appear to use gustatory rather than visual location; the reverse is true for larger eels. Inertial suction is the most important means of capturing smaller optimally-sized particles. The upper size limit to efficient feeding is dictated by mouth width, physical nature of particles and hunger motivation, the lower limit by location abilities. Optimum sizes are about 0.4-0.6 of mouth width but small eels take a wide range of sizes with almost equal facility. Granules are more water-stable than pellets and retain attractiveness for longer; both, however, are suitabilty stable in relation to observed consumption times. Relationships to data for wild eels and to feeding in warmwater culture are discussed and feed size and type recommendations made.

83-000036 Miller, D. W. MODIFICATION OF LOUDON AUTOMATIC FEEDERS. *Prog. Fish-Cult.* 44(4):169. Oct. 1982. SFA 28(1)

[Jordan River Natl. Fish Hatchery, Elmira, MI 49730]

83-000037 Spinelli, J.; C. R. Houle and J. C. Wekell. THE EFFECT OF PHYTATES ON THE GROWTH OF RAINBOW TROUT (*SALMO GAIRDNERI*) FED PURIFIED DIETS CONTAINING VARYING QUANTITIES OF CALCIUM AND MAGNESIUM. *Aquaculture* 30(1-4):71-83. Jan. 1983. SFA 28(1)

[NMFS, 2725 Montlake Blvd. East, Seattle, WA 98112]

83-000038 Statler, D. P. USE OF SELF-FEEDERS FOR REARING STEELHEAD TROUT AT DWORSHAK NATIONAL FISH HATCHERY. *Prog. Fish-Cult.* 44(4):195. Oct. 1982. SFA 28(1)

[U.S. FWS, Dworshak Natl. Fish hatchery, Ahsahka, ID 83520]

TRANSPORTING FISH

83-000039 Guest, W. C. and J. A. Prentice. TRANSPORTATION TECHNIQUES FOR BLUEBACK HERRING. *Prog. Fish-Cult.* 44(4):183-185. Oct. 1982. SFA 28(1)

[Heart of the Hills Res. Stn., Tex. Parks Wildl. Dep., Junction Star Route, Box 62, Ingram 78025]

83-000040 Haswell, S. M.; G. J. Thorpe; L. E. Harris; T. C. Mandis and R. E. Rauch. MILLIMOLAR QUANTITIES OF SODIUM SALTS USED AS PROPHYLAXIS DURING FISH HAULING. *Prog. Fish-Cult.* 44(4):179-183. Oct. 1982. SFA 28(1)

[Dep. Zool. Entomol., Colo. State Univ., Fort Collins 80523]

83-000041 Korovin, V. A.; A. S. Zybin and V. B. Legomin. RESPONSE OF JUVENILE FISHES TO STRESS FACTORS ASSOCIATED WITH TRANSFERS DURING FISH FARMING. *J. Ichthyol. (Engl. Trans. Vopr. Ikhtiol.)* 22(2):98-102. 1982.

TRANSPORTING FISH (CONTINUED)

83-000041 CONTINUED SFA 28(1)
[Siberian Anim. Husbandry Res., Proj.-Eng. Inst., Novosibirsk, USSR]

MISCELLANEOUS CULTURE TECHNIQUES AND EQUIPMENT

83-000042 Lincoln, R. F. and A. P. Scott. PRODUCTION OF ALL-FEMALE TRIPLOID RAINBOW TROUT. *Aquaculture* 30(1-4):375-380. Jan. 1983. SFA 28(1)
[Fish. Lab., Lowestoft, Suffolk NR33 0HT, England] Triploid rainbow trout were produced by heat shock treatment of eggs soon after fertilization with either normal sperm or sperm from masculinised females. The proportion of triploid fry, as judged from red blood cell nuclear volume, varied between 75% and 100% in three experiments using different batches of eggs from an autumn-spawning strain of trout while a single batch of eggs from a winter-spawning strain yielded 50% triploids. A microscopic examination of the gonads was made on 5-month-old fish weighing between 1 and 3g. In female controls the ovaries were packed with oocytes while those from female triploids, although showing the typical lamellar structure of an ovary, contained no oocytes, thus indicating that female triploids are sterile. The testes from triploid males appeared to be developing normally. The use of masculinized females combined with heat shock treatment of eggs to produce triploids, allowed the production of sterile all-female triploids. This should have considerable potential for aquaculture.

83-000043 Marking, L. L. and T. D. Bills. FACTORS AFFECTING THE EFFICIENCY OF CLINOPTILOLITE FOR REMOVING AMMONIA FROM WATER. *Prog. Fish-Cult.* 44(4):187-189. Oct. 1982. SFA 28(1)
[U.S. FWS, P.O. Box 818, La Crosse, WI 54601]

83-000044 Schroeder, G. L. STABLE ISOTOPE RATIOS AS NATURALLY OCCURRING TRACERS IN THE AQUACULTURE FOOD WEB. *Aquaculture* 30(1-4):203-210. Jan. 1983. SFA 28(1)
[Inst. Anim. Sci., Agric. Res. Organ. The Volcani Cent., P.O.B. 6, Beit Dagan, Israel]

83-000045 Stoss, J. and T. Refstie. SHORT-TERM STORAGE AND CRYOPRESERVATION OF MILT FROM ATLANTIC SALMON AND SEA TROUT. *Aquaculture* 30(1-4):229-236. Jan. 1983. SFA 28(1)
[Resour. Serv. Br., Dep. Fish. Oceans, West Vancouver Lab., 4160 Marine Dr., West Vancouver, BC V7V 1N6, Canada] EXperiments on short-term preservation of sperm were performed with Atlantic salmon (*Salmo salar*). Fertility was maintained for up to 10 days when 2 mm thick samples were stored at 0°C under an oxygen atmosphere in the presence of antibiotics (125 IU Penicillin and 125 µg streptomycin per ml sperm). Fertility was completely lost after 24 days. Sperm stored without antibiotics fertilized 100% of eggs after 6 days. Cryopreservation was carried out with milt from Atlantic salmon and sea trout (*Salmo trutta*). Semen mixed with extender was forzen on dry ice (pellets with subsequent storage in liquid Nitrogen. Sperm pellets were thawed in 0.12-M $NaHCO_3$-solution (10°C) before insemination. The suitability of an extender as previously described by Stoss and Holtz and of a 0.3-M glucose solution with the additon of 10% DMSO, was tested on two different batches of sperm and eggs in Atlantic salmon and sea trout. In addition, the extender earlier reported by Mounib and an aqueous solution of 10% DMSO were only used in Atlantic salmon with one batch of gametes. Insemination with cryopreserved Atlnatic salmon sperm resulted in 36 to 91.3% eyed eggs (control = 100). The differences were

MISCELLANEOUS CULTURE TECHNIQUES AND EQUIPMENT (CONTINUED)

83-000045 CONTINUED caused by the type of extender and the batch of gametes employed. The very simple extender consisting of 0.3 M glucose and 10% DMSO only was the most successful. Results with cryopreserved sea trout sperm ranged between 38.6-54.8% eyed eggs, showing no difference between treatment.

CHEMICAL LIMNOLOGY AND OCEANOGRAPHY

83-000046 Prepas, E. E. and D. O. Trew. EVALUATION OF THE PHOSPHORUS-CHLOROPHYLL RELATIONSHIP FOR LAKES OFF THE PRECAMBRIAN SHIELD IN WESTERN CANADA. *Can. J. Fish. Aquatic Sci.* 40(1):27-35. Jan. 1983. In English with French summ. SFA 28(1)
[Dep. Zool., Univ. Alberta, Edmonton, AB T6G 2E9, Canada]

BENTHOS

83-000047 Beckett, D. C. and M. C. Miller. MACROINVERTEBRATE COLONIZATION OF MULTIPLATE SAMPLERS IN THE OHIO RIVER: THE EFFECT OF DAMS. *Can. J. Fish. Aquatic Sci.* 39(12):1622-1627. Dec. 1982. In English with French summ. SFA 28(1)
[Environ. Lab./ AHG, Waterways Exp. Stn., P.O. Box 631, Vicksburg, MS 39180]

83-000048 MacFarlane, M. B. and T. F. Waters. ANNUAL PRODUCTION BY CADDISFLIES AND MAYFLIES IN A WESTERN MINNESOTA PLAINS STREAM. *Can. J. Fish. Aquatic Sci.* 39(12):1628-1635. Dec. 1982. In English with French summ. SFA 28(1)
[107 N. Prairie St., Shakopee, MN 55379]

83-000049 Maude, S. H. and D. D. Williams. BEHAVIOR OF CRAYFISH IN WATER CURRENTS: HYDRODYNAMICS OF EIGHT SPECIES WITH REFERENCE TO THEIR DISTRIBUTION PATTERNS IN SOUTHERN ONTARIO. *Can. J. Fish. Aquatic Sci.* 40(1):68-77. Jan. 1983. In English with French summ. SFA 28(1)
[Div. Life Sci., Scarborough Coll., Univ. Toronto, West Hill, ON M1C 1A4, Canada]

PLANKTON

83-000050 Cammen, L. M. and J. A. Walker. DISTRIBUTION AND ACTIVITY OF ATTACHED AND FREE-LIVING SUSPENDED BACTERIA IN THE BAY OF FUNDY. *Can. J. Fish. Aquatic Sci.* 39(12):1655-1663. Dec. 1982. In English with French summ. SFA 28(1)
[Bigelow Lab., Ocean Sci., West Boothbay Harbor, ME 04575]

83-000051 Riessen, H. P. PREDATORY BEHAVIOR AND PREY SELECTIVITY OF THE PELAGIC WATER MITE *PIONA CONSTRICTA*. *Can. J. Fish. Aquatic Sci.* 39(12):1569-1579. Dec. 1982. In English with French summ. SFA 28(1)
[Dep. Biol., Univ. Santa Clara, Santa Clara, CA 95053]

PRIMARY PRODUCTION

83-000052 Vincent, W. F. and C. L. Vincent. FACTORS CONTROLLING PHYTOPLANKTON PRODUCTION IN LAKE VANDA (77°S). *Can. J. Fish. Aquatic Sci.* 39(12):1602-1609. Dec. 1982. In English with French summ. SFA 28(1)
[Freshwater Sect., Ecol. Div., DSIR, Box 415, Taupo, New Zealand]

MORPHOLOGY

83-000053 Bell, M. A. and T. R. Haglund. FINE-SCALE TEMPORAL VARIATION OF THE MIOCENE STICKLEBACK *GASTEROSTEUS DORYSSUS*. *Paleobiology* 8(3):282-292. 1982. SFA 28(1)
[Dep. Ecol. Evol., State Univ. N.Y., Stony Brook 11794]

83-000054 Bell, M. A. MELANISM IN A HIGH ELEVATION POPULATION OF *GASTEROSTEUS ACULEATUS*. *Copeia* 1982(4):829-835. 21 Dec. 1982. SFA 28(1)
[Dep. Ecol. Evol., State Univ. N.Y., Stony Brook 11794]

83-000055 Burdak, V. D. CONVERGENT SIMILARITY OF THE SCALE COVER MACRORELIEF IN BONY FISHES (OSTEICHTHYES) AND THE BEAVER, *CASTOR FIBER*. *J. Ichthyol.* (*Engl. Transl. Vopr. Ikhtiol.*) 22(1):155-159. 1982. SFA 28(1)
[INBYuM, Sevastopol, USSR]

83-000056 Butler, J. L.; H. G. Moser; G. S. Hageman and L. E. Nordgren. DEVELOPMENTAL STAGES OF THREE CALIFORNIA SEA BASSES (*PARALABRAX*, PISCES, SERRANIDAE). *Calif. Coop. Oceanic Fish. Invest.* 23:252-268. Oct. 1982. SFA 28(1)
[NMFS, Southwest Fish. Cent., La Jolla, CA 92038]

83-000057 Dasgupta, J. D. and U. N. Singh. SPATIO-TEMPORAL DISTRIBUTION OF GAP JUNCTIONS IN ZEBRA FISH EMBRYO. *Wilhelm Roux's Arch. Dev. Biol.* 191(6):378-380. Dec. 1982. SFA 28(1)
[Dep. Pharmacol., Sch. Med., Vanderbilt Univ., Nashville, TN 37232]

83-000058 De Smet, W. M. A. LES STRUCTURES PRONEPHRETIQUES DES POLYPTERES (POISSONS BRACHIOPTERYGIENS). [THE PRONEPHROS STRUCTURE OF *POLYPTERUS*.] *Bull. Inst. R. Sci. Belg. Biol.* 53(2):1-89. 31 Dec. 1981. IN French with with English summ. SFA 28(1)

83-000059 Dunel-Erb, S.; Y. Bailly and P. Laurent. NEUROEPITHELIAL CELLS IN FISH GILL PRIMARY LAMELLAE. *J. Appl. Physiol. Respir. Environ. Exercise Physiol.* 53(6):1342-1353. Dec. 1982. SFA 28(1)
[Lab. Physiol. Comp. Regul., CNRS, 67037 Strasbourg-Cedex, France]

83-000060 Fernald, R. D. CONE MOSAIC IN A TELEOST RETINA: NO DIFFERENCE BETWEEN LIGHT AND DARK ADAPTED STATES. *Experientia (Basel)* 38(11):1337-1339. 15 Nov. 1982. SFA 28(1)
[Dep. Biol., Univ. Oreg., Eugene 97403]

83-000061 Filyushina, Y. Y.; M. D. Shmerling and I. I. Buzuyeva. AN ELECTRON MICROSCOPIC AND ULTRACYTOCHEMICAL STUDY OF THE SKELETAL MUSCLES OF THE BLACK BAIKAL GRAYLING, *THYMALLUS ARCTICUS BAICALENSIS*, IN THE NORMAL

MORPHOLOGY (CONTINUED)

83-000061 CONTINUED STATE AND UNDER PHYSICAL STRESS. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 22(1):89-95. 1982. SFA 28(1)
[Inst. Physiol., Siberian Dep. USSR Acad. Med. Sci., Novosibirsk, USSR]

83-000062 Fulcher, A. S. and W. S. Woolcott. COMPARISON OF THE OSTEOLOGY OF THE DARTER *PERCINA ROANOKA* WITH SPECIES OF THE SUBGENERA *ALVORDIUS* AND *ERICOSMA* (PISCES: PERCIDAE). *Va. J. Sci.* 33(3):107. 1982. Abstract only. SFA 28(1)
[Dep. Biol., Univ. Richmond, VA 23173]

83-000063 Geevarghese, C. and P. A. John. AN UNUSUAL METHOD OF FORMATION OF MICROPYLE IN THE OOCYTES OF A GOBIID FISH *OLIGOLEPIS ACUTIPENNIS* (CUV. & VAL.). *Acta Zool. (Stockh.)* 63(3):161-163. 1982. SFA 28(1)
[Dep. Aquatic Biol. Fish., Univ. Kerala, Trivandrum, Kerala, India]

83-000064 George, C. J.; A. E. Ellis and D. W. Bruno. ON REMEMBRANCE OF THE ABDOMINAL PORES IN RAINBOW TROUT, *SALMO GAIRDNERI* RICHARDSON, AND SOME OTHER SALMONID SPP. *J. Fish Biol.* 21(6):643-647. Dec. 1982. SFA 28(1)
[Dep. Biol. Sci., Union Coll., Schnectady, NY 12308]

83-000065 Joswiak, G. R. and W. S. Moore. DISCRIMINANT ANALYSIS OF TWO CYPRINID FISHES *PHOXINUS EOS* AND *PHOXINUS ERYTHROGASTER* (PISCES: CYPRINIDAE). *Am. Midl. Nat.* 108(2):398-401. Oct. 1982. SFA 28(1)
[Dep. Biol. Sci., Wayne State Univ., Detroit, MI 48202] Discriminant analysis was applied to morphological data from two very similar minnows, *Phoxinus eos* and *P. erythrogaster*. Variables which were not significantly different between species in univariate t-tests provided good discrimination when their covariance was considered. Specimens with intermediate scores tended to be small and from allopatric localities where hybridization is extremely unlikely.

83-000066 Kondyurin, V. V. and N. A. Myagkov. MORPHOLOGICAL CHARACTERISTICS OF TWO SPECIES OF SPINY DOGFISH, *SQUALUS ACANTHIAS* AND *SQUALUS FERNANDINUS* (SQUALIDAE, ELASMOBRANCHII), FROM THE SOUTHEASTERN ATLANTIC. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 22(2):41-51. 1982. SFA 28(1)
[Kalinigrad Mar. Eng. Univ., Kalingrad, USSR]

83-000067 Korovina, V. M. and Y. S. Reshetnikov. PRIMITIVE STRUCTURAL PROPERTIES OF THE INTESTINE OF *PROSOPIUM CYLINDRACEUM (SALMONIDAE)*. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 22(2):84-91. 1982. SFA 28(1)
[Zool. Inst. USSR Acad. Sci., Leningrad, USSR]

83-000068 Korovina, V. M. and E. A. Dorofeeva. STRUCTURAL PECULIARITIES OF THE MIDGUT OF *SALMO ISCHCHAN GEGARKUNI*. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 21(6):106-114. 1981. SFA 28(1)
[Zool. Inst., Acad. Sci. USSR, Leningrad, USSR]

83-000069 Kosaka, T. and K. Hama. STRUCTURE OF THE MITRAL CELL IN THE OLFACTORY BULB OF THE GOLDFISH (*CARASSIUS AURATUS*). *J. Comp. Neurol.* 212(4):365-384. 20 Dec. 1982. SFA 28(1)
[Dep. Fine Morphol., Inst. Med. Sci., Univ. Tokyo, Tokyo 108, Japan]

MORPHOLOGY (CONTINUED)

83-000070 Kovalevskaya, N. V. DEVELOPMENT OF FLYING FISH, *HIRUNDICHTHYS MARGINATUS* (EXOCOETIDAE). *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 21(6):82-88. 1981. SFA 28(1)

[Inst. Oceanol. Acad Sci. USSR, Moscow, USSR] Development of the flying fish, *Hirundichthys marginatus*, living near the Pacific coast of America was studied. The embryonic and initial stages of postembryonic development are described for the first time. The eggs of *H. marginatus* are demersal. Their diameter is 1.9-2.1 mm. A solitary thick filiment is present at the vegetal pole of the egg which is used for its attachment on the spawning substrate. Changes in pigmentation are observed during postembryonic ontogenesis which are typical only for the members of the genus *Hirundichthys*: the body at a length of about 5 mm, has uniform pigment except for the caudal peduncle; at 7.0-10.0 mm length, the pigment appears on the caudal peduncle and disappears between the hind margin of gill operculum and base of the pelvic fins. This pigment again appears at a body length 20.0 mm

83-000071 Krasnopër, Y. V. and A. I. Bakanov. RELATIONSHIP BETWEEN THE FULTON CONDITION FACTOR AND ROUNDNESS OF FISH BODIES. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 22(2):145-146. 1982. SFA 28(1)

[Inst. Biol. Inland Waters, USSR Acad. Sci., Borok, Yaroslavl'oblast, USSR]

83-000072 Kuliyev, Z. M. MORPHOBIOLOGICAL CHARACTERISTICS OF THE SEA ZANDER *SCHIZOSTEDION MARINUM* CUVIER FROM THE CASPIAN SEA. *J. Ichthyol. (Engl. Trans. Vopr. Ikhtiol.)* 21(5):36-42. 1981. SFA 28(1)

[Caspian Biol. Stn., Inst. Zool. Azerbaijanian Acad. Sci., USSR] The presence of real differences, with respect to many characters between populations of sea zander inhabiting the western and eastern parts of the Southern Capsian Sea indicates that these are separate populations. The population of sea zander off the eastern shore, unlike that off the western shore, exhibit a relatively high number of soft rays on the second dorsal and anal fin, fewer rakers on the first branchial arch, larger interorbital and predorsal distances, a longer head, a wider forehead, and longer anal, ventral, and dorsal (second) fins. In view of the sharp reductions in the stocks of the sea zander throughout the Caspian, it would be desirable to renew and broaden work on artificially breeding the eastern population of this fish. It would also be desirable to begin research on the restoration of stocks of the western population.

83-000073 Leino, R. L. RODLET CELLS IN THE GILL AND INTESTINE OF *CATOSTOMUS COMMERSONI* AND *PERCA FLAVESCENS*: A COMPARISON OF THEIR LIGHT AND ELECTRON MICROSCOPIC CYTOCHEMISTRY WITH THAT OF MUCOUS AND GRANULAR CELLS. *Can. J. Zool.* 60(11):2768-2782. Nov. 1982. In English with French summ. SFA 28(1)

[Dep. Biomed. Anat., Sch. Med., Univ. Minn., Duluth 55812]

83-000074 Lewis, S. V. and I. C. Potter. A LIGHT AND ELECTRON MICROSCOPE STUDY OF THE GILLS OF LARVAL LAMPREYS (*GEOTRIA AUSTRALIS*) WITH PARTICULAR REFERENCE TO THE WATER-BLOOD PATHWAY. *J. Zool. (Lond.)* 198(2):157-176. Oct. 1982. SFA 28(1)

[I.C. Potter: Sch. Environ. Life Sci., Murdoch Univ., Murdock, West. Australia 6150, Australia]

83-000075 Libosvárský, J. NOTE ON COMPARISON OF MORPHOMETRIC CHARACTERS IN FISH OF UNEQUAL BODY SIZE. *Folia Zool.* 31(2):169-174. 1982. In English with Czech summ. SFA 28(1)

[Inst. Vert. Zool., Czech. Acad. Sci., Brno, Czechoslovakia]

MORPHOLOGY (CONTINUED)

83-000076 Lindsey, C. C. and L. F. Kratt. JUMBO SPOTTED FORM OF LEAST CISCO *COREGONUS SARDINELLA* IN LAKES OF SOUTHERN YUKON TERRITORY. *Can. J. Zool.* 60(11):2783-2786. Nov. 1982. In English with French summ. SFA 28(1)
[Inst. Anim. Resour. Ecol., Univ. British Columbia, Vancouver, BC V6T 1W5, Canada] Four lakes on the upper Yukon River drainage contain a strikingly spotted jumbo form of least cisco, with fork lengths up to 452 mm, larger than all previously know lacustrine or anadromous forms. The jumbo fish, with high gill raker counts (48-52), are probably nonmigratory. They may in each lake represent parallel responses to high dissolved solids, little competition, and unusually favourable conditions for growth. Available material is insufficient to establish whether small specimens in these lakes are young or slow-growing individuals of the jumbo spotted form, or whether the lakes contain two sympatric populations.

83-000077 Matarese, A. C. and J. B. Marliave. LARVAL DEVELOPMENT OF LABORATORY-REARED ROSYLIP SCULPIN, *ASCELICHTHYS RHODORUS* (COTTIDAE). *NOAA Fish. Bull.* 80(2):345-355. Apr. 1982. SFA 28(1)
[NMFS, 2725 Montlake Blvd. East, Seattle, WA 98112]

83-000078 Mercy, T. V. A.; K. G. Padmanabhan and N. K. Pillai. MORPHOLOGICAL STUDIES OF THE OOCYTES OF THE BLIND CATFISH *HORAGLANIS KRISHNAI* MENON. *Zool. Anz.* 209(3/4):211-223. 1982. SFA 28(1)
[Dep. Aquatic Biol. Fish., Univ. Kerala, Trivandrum, Kerala, India]

83-000079 Morawa, F. ZAHL UND ANOMALIEN DER WIRBEL VOM SPROTT (*SPRATTUS SPRATTUS* L.) ZWISCHEN DEUTSCHER UND DANZIGER BUCHT. [NUMBER OF VERTEBRAE AND ANOMALISM OF THE SPRAT (*SPRATTUS SPRATTUS* L.) FROM THE EASTERN PART OF THE NORTH SEA TO THE GULF OF GDANSK.] *Arch. Hydrobiol.* 95:263-270. 1982. In German with English summ. SFA 28(1)
[Landwirtschaftskammer Hannover, Johannssenstraße 10, D-3000 Hannover, West Germany]

83-000080 Motta, P. J. FUNCTIONAL MORPHOLOGY OF THE HEAD OF THE INERTIAL SUCTION FEEDING BUTTERFLYFISH, *CHAETODON MILIARIS* (PERCIFORMES, CHAETODONTIDAE). *J. Morphol.* 174(3):283-312. Dec. 1982. SFA 28(1)
[Dep. Zool., Univ. Hawaii, Honolulu 96822]

83-000081 Ni, I-H. MERISTIC VARIATION IN BEAKED REDFISHES, *SEBASTES MENTELLA* AND *S. FASCIATUS*, IN THE NORTHWEST ATLANTIC. *Can. J. Fish. Aquatic Sci.* 39(12):1664-1685. Dec. 1982. In English with French summ. SFA 28(1)
[Fish. Res. Br., Dep. Fish. Oceans, P.O. Box 5667, St. John's NF A1C 5X1, Canada]

83-000082 Pankhurst, N. W. CHANGES IN THE SKIN-SCALE COMPLEX WITH SEXUAL MATURATION IN THE EUROPEAN EEL, *ANGUILLA ANGUILLA* (L.). *J. Fish Biol.* 21(5):549-561. Nov. 1982. SFA 28(1)
[Dep. Zool., Univ. Alberta, Edmonton, AB T6G 2E9, Canada] Structural features of the epidermis, dermis and scales were examined in adult female *Anguilla anguilla* of varying sexual maturity. Advanced sexual stages were obtained by hormone injection. The dermis increased in thickness with both size and sexual development. Epidermal thickness was unrelated to size or maturity but mucous cell densities decreased in more mature animals. Hormone treated eels showed a loss of mucous cells accompanied by degeneration of the epidermis. Scale areas increased from 50% in sexually immature adults to 145% in sexually maturing eels. Skin calcium values ranged from 0.27 to 0.83 mg

MORPHOLOGY (CONTINUED)

83-000082 CONTINUED cm^{-2} and did not show any relation to either scale or sexual maturity. The possible relevance of structural changes to migration is discussed.

83-000083 Peňáz, M.; E. Wohlgemuth; J.Hamáčková and J. Kouríl. EARLY ONTOGENY OF THE TENCH, *TINCA TINCA* II. LARVAL PERIOD. *Folia Zool.* 31(2):175-180. 1982. In English with Czech summ. SFA 28(1)
[Inst. Vert. Zool., Czech. Acad. Sci., Brno, Czechoslovakia]

83-000084 Petrova, V. G. ELECTRON MICROSCOPIC STUDY OF THE EPITHELIUM OF DISTAL NEPHRON SECTION AND KIDNEY TUBULES OF FRESH-WATER TELEOSTEAN FISHES. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 21(6):163-166. 1981. SFA 28(1)
[Leningrad Sanitary-Hygienic Med. Inst., Leningrad, USSR]

83-000085 Potthoff, T. and S. Kelley. DEVELOPMENT OF THE VERTEBRAL COLUMN, FINS AND FIN SUPPORTS, BRANCHIOSTEGAL RAYS, AND SQUAMATION IN THE SWORDFISH, *XIPHIAS GLADIUS*. *NOAA Fish. Bull.* 80(2):161-186. Apr. 1982. SFA 28(1)
[NMFS, 75 Virginia Beach Dr., Miami, FL 33149]

83-000086 Pulsford, A.; R. Fänge and W. J. W. Morrow. CELL TYPES AND INTERACTIONS IN THE SPLEEN OF THE DOGFISH *SCYLIORHINUS CANICULA* L.: AN ELECTRON MICROSCOPIC STUDY. *J. Fish Biol.* 21(6):649-662. Dec. 1982. SFA 28(1)
[Mar. Biol. Assoc. U.K., The Laboratory, Citadell Hill, The Hoe, Plymouth, England]

83-000087 Radtke, R. L. and J. M. Dean. INCREMENT FORMATION IN THE OTOLITHS OF EMBRYOS, LARVAE, AND JUVENILES OF THE MUMMICHOG, *FUNDULUS HETEROCLITUS*. *NOAA Fish. Bull.* 80(2):201-215. Apr. 1982. SFA 28(1)
[Pacific Gamefish Found., P.O. Box 35115, Honolulu, HI 96825]

83-000088 Rubtsov, V. V. THE DEPENDENCE OF SOME MORPHOPHYSIOLOGICAL CHARACTERISTICS OF THE EGGS OF THE CARP *CYPRINUS CARPIO* L. ON CHANGES IN THE MICROSTRUCTURE OF THE EGG MEMBRANE. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 21(5):43-51. 1981. SFA 28(1)
[IEMEZh, Moscow, USSR]

83-000089 Savicheva, E. A. EMBRYONIC DEVELOPMENT OF THE PACIFIC CAPELIN, *MALLOTUS VILLOSUS SOCIALIS* (OSMERIDAE), IN THE EASTERN OKHOTSK SEA. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 22(2):69-74. 1982. SFA 28(1)
[KoTINRO, Peteropavlovsk-Kamchatskiy, USSR]

83-000090 Selezneva, A. A. NATURE OF THE BRANCHIOSTEGAL SERIES OF PALEONISCID FISHES (LOWER ACTINOPTERYGII). *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 22(2):75-83. 1982. SFA 28(1)
[Paleontol. Inst., Acad. Sci. USSR, Moscow, USSR]

83-000091 Sivtseva, L. V. QUALITATIVE COMPOSITION AND DISTRIBUTION OF CAROTENOIDS AND VITAMIN A IN THE ORGANS AND TISSUES OF RAINBOW TROUT, *SALMO GAIRDNERI*. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 22(1):96-100. 1982.

MORPHOLOGY (CONTINUED)

83-000091 CONTINUED SFA 28(1)
[Biol. Fac., Moscow Univ., USSR]

83-000092 Tave, D.; J. E. Bartels and R. O. Smitherman. STUMPBODY *SAROTHERODON AUREUS* (STEINDACHNER) (=*TILAPIA AUREA*) AND TAIL-LESS *S. NILOTICUS* (K.) (=*T. NILOTICA*): TWO VERTEBRAL ANOMALIES AND THEIR EFFECTS ON BODY LENGTH. *J. Fish Dis.* 5(6):487-494. Nov. 1982. SFA 28(1)
[Dep. Entomol. Fish Wildl., Univ. Minn., St. Paul 55108]

83-000093 Wegner, N. A QUALITATIVE AND QUANTITATIVE STUDY OF A SENSORY EPITHELIUM IN THE INNER EAR OF A FISH (*COLISA LABIOSA*; ANABANTIDAE). *Acta Zool. (Stockh.)* 63(3):133-146. 1982. SFA 28(1)
[Zool. Lab., Univ. Aarhus, DK-8000 Aarhus C, Denmark]

83-000094 Wicker, A. M. and M. T. Huish. MORPHOLOGY OF BLUEGILL (*LEPOMIS MACROCHIRUS*), CHAIN PICKEREL (*ESOX NIGER*) AND YELLOW PERCH (*PERCA FLAVESCENS*) SPERMATOZOA, AS DETERMINED BY SCANNING ELECTRON MICROSCOPY. *Copeia* 1982(4):955-957. 21 Dec. 1982. SFA 28(1)
[Fla. Game Fresh Water Fish Comm., Fish. Res. Lab., P.O. Box 1903, Eustis 32726]

83-000095 Wilson, M. V. H. and P. Veilleux. COMPARATIVE OSTEOLOGY AND RELATIONSHIPS OF THE UMBRIDAE (PISCES: SALMONIFORMES). *Zool. J. Linn. Soc.* 76(4):321-352. Dec. 1982. SFA 28(1)
[Dep. Zool., Univ. Alberta, Edmonton, AB T6G 2E9, Canada]

83-000096 Yasargil, G. M.; N. G. Greeff; H. R. Luescher; K. Akert and C. Sandri. THE STRUCTURAL CORRELATE OF SALTATORY CONDUCTION ALONG THE MAUTHNER AXON IN THE TENCH (*TINCA TINCA* L.): IDENTIFICATION OF NODAL EQUIVALENTS AT THE AXON COLLATERALS. *J. Comp. Neurol.* 212(4):417-424. 20 Dec. 1982. SFA 28(1)
[Dep. Physiol., Univ. Zurich, Zurich, Switzerland]

83-000097 Yevseyenko, S. A. and M. M. Nevinskiy. ON THE DEVELOPMENT OF THE EGGS AND LARVAE OF THE YELLOW-TAILED DAB *LIMANDA FERRUGINEA* STORER AND THEIR PASSIVE TRANSPORT IN THE NORTHWESTERN ATLANTIC. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 21(5):65-74. 1981. SFA 28(1)
[VNIRO, Moscow, USSR] A description is given of the embryonic and post-embryonic development of the yellow-tailed dab *Limanda ferruginea* Storer. The nature of the passive transport of the eggs and larva of this species in different areas of the northwestern Atlantic is discussed. It is suggested that in the range of the yellow-tailed dab there are various groups of interrelated populations. The influence of the Gulf Stream on the passive transport of eggs and larvae in the waters near Georges Bank and the Grand Banks of Newfoundland is considered.

83-000098 Zaccone, G. and A. Licata. HISTOCHEMISTRY AND FINE STRUCTURE OF THE FLAME CONE CELLS IN THE SKIN EPIDERMIS OF THE SEA HORSE FISH *HIPPOCAMPUS RAMULOSUS* LEACH 1814 (TELEOSTEI: SYNGNATHIDAE). *Arch. Biol. Morphol. Exp. Comp.* 93(3):249-266. 1982. SFA 28(1)
[Inst. Zool. Comp. Anat., Messina Univ., Italy]

PHYSIOLOGY

83-000099 Allen, J. R. M. and R. J. Wootton. EFFECT OF FOOD ON THE GROWTH OF CARCASE, LIVER AND OVARY IN FEMALE *GASTEROSTEUS ACULEATUS* L. *J. Fish Biol.* 21(5):537-547. Nov. 1982. SFA 28(1)
[Dep. Zool., Univ. Coll. Wales, Penglais, Aberystwyth, Dyfed, Wales]

83-000100 Barbannikova, I. A.; N. N. Bayunova and A. A. Strel'bitskaya. INTERRENAL GLAND DEVELOPMENT DURING ONTOGENESIS OF STURGEONS AND ITS RESPONSE TO CHANGES IN WATER TEMPERATURE. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 21(6):115-122. 1981. SFA 28(1)
[Cent. Lab. Regeneration Fish Reserves Glavrybvoda, Leningrad State Univ., USSR]

83-000101 Bass, A. H. and C. D. Hopkins. COMPARATIVE ASPECTS OF BRAIN ORGANIZATION OF AN AFRICAN "WAVE" ELECTRIC FISH, *GYMNARCHUS NILOTICUS*. *J. Morphol.* 174(3):313-334. Dec. 1982. SFA 28(1)
[Dep. Ecol. Behav. Biol., Univ. Minn., Minneapolis 55455]

83-000102 Bass, A. H. EVOLUTION OF THE VESTIBULOLATERAL LOBE OF THE CEREBELLUM IN ELECTRORECEPTIVE AND NONELECTRORECEPTIVE TELEOSTS. *J. Morphol.* 174(3):335-348. Dec. 1982. SFA 28(1)
[Dep. Ecol. Behav. Biol., Univ. Minn., Minneapolis 55455]

83-000103 Belova, N. V. ECOLOGICAL-PHYSIOLOGICAL PRECULIARITIES OF SEMEN OF POND CARPS. II. CHANGE IN THE PHYSIOLOGICAL PARAMETERS OF SPERMATOZOIDS OF SOME CARPS UNDER THE INFLUENCE OF ENVIRONMENTAL FACTORS. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 21(6):70-81. 1981. SFA 28(1)
[Biol. Fac., Moscow State Univ., Moscow, USSR]

83-000104 Bern, H. A.; S. Goldstein; R. S. Nishioka and R. Gunther. SEASONAL CHANGES IN THE CONTENT OF UROTENSIN II IN THE UROPHYSIS OF THE GOBY, *GILLICHTHYS MIRABILIS*. *Acta Zool. (Stockh.)* 63(3):177-180. 1982. SFA 28(1)
[Dep. Zool., Cancer Res. Lab., Univ. Calif., Berkeley 94720]

83-000105 Bezdenezhinykh, V. A. and V. B. Petukhov. OOGENESIS OF THE COMMON EEL, *ANGUILLA ANGUILLA*. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 21(6):100-105. 1981. SFA 28(1)
[Inst. Zool., Belorussian Acad. Sci., Minsk, USSR]

83-000106 Brind, J. L.; E. Alani; J. R. Matias; J. Markofsky and R. L. Rizer. COMPOSITION OF THE LIPID DROPLET IN EMBRYOS OF THE ANNUAL FISH *NOTHOBRANCHIUS GUENTHERI*. *Comp. Biochem. Physiol. B Comp. Biochem.* 73(4):915-917. 1982. SFA 28(1)
[Orentreich Found. Advancement Sci., Inc., 910 Fifth St., New York, NY 10021]

83-000107 Bry, C. DAILY VARIATIONS IN PLASMA CORTISOL LEVELS OF INDIVIDUAL FEMALE RAINBOW TROUT *SALMO GAIRDNERI*: EVIDENCE FOR A POST-FEEDING PEAK IN WELL-ADAPTED FISH. *Gen. Comp. Endocrinol.* 48(4):462-468. Dec. 1982. SFA 28(1)
[Lab. Physiol. Poissons, INRA, 78350 Jouy en Jossas, France]

PHYSIOLOGY (CONTINUED)

83-000108 Buckman, M. and R. D. Ewing. RELATIONSHIP BETWEEN SIZE AND TIME OF ENTRY INTO THE SEA AND GILL (Na+K)-ATPase ACTIVITY FOR JUVENILE SPRING CHINOOK SALMON. *Trans. Am. Fish. Soc.* 111(6):681-687. Nov. 1982. SFA 28(1)
[Fish. Res. Lab., Oreg. Dep. Fish Wildl., Corvallis 97333]

83-000109 Bustamante, G. and M. I. Shatunovskiy. SEASONAL DYNAMICS OF SOME MORPHOPHYSIOLOGICAL AND BIOCHEMICAL PARAMETERS OF THE BAR JACK, *CARANX RUBER* (CARANGIDAE), IN THE SOUTHWESTERN REGION OF THE CUBAN SHELF. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 21(6):170-175. 1981. SFA 28(1)
[Inst. Oceanol., Acad Sci., Cuba]

83-000110 Carneiro, N. M. and A. D. Amaral. EFFECTS OF INSULIN AND GLUCAGON ON PLASMA GLUCOSE LEVELS AND GLYCOGEN CONTENT IN ORGANS OF THE FRESHWATER TELEOST *PIMELODUS MACULATUS*. *Gen. Comp. Endocrinol.* 49(1):115-121. Jan. 1983. SFA 28(1)
[Dep. Fisiol. Geral, Inst. Biocienc., Univ. São Paulo, Brazil]

83-000111 Cetta, F. and F. W. Goetz. OVARIAN AND PLASMA PROSTAGLANDIN E AND F LEVELS IN BROOK TROUT (*SALVELINUS FONTINALIS*) DURING PITUITARY-INDUCED OVULATION. *Biol. Reprod.* 27(5):1216-1221. Dec. 1982. SFA 28(1)
[F.W. Goetz: Dep. Biol., Univ. Notre Dame, Notre Dame, IN 46556]

83-000112 Chang, J. P.; A. F. Cook and R. E. Peter. INFLUENCE OF CATECHOLAMINES ON GONADOTROPIN SECRETION IN GOLDFISH, *CARASSIUS AURATUS*. *Gen. Comp. Endocrinol.* 49(1):22-31. Jan. 1983. SFA 28(1)
[Zool. Dep., Univ. Alberta, Edmonton, AB T6G 2E9, Canada]

83-000113 Cole, G. J. AXONAL TRANSPORT OF GLYCOPROTEINS IN REGENERATING GARFISH OLFACTORY NERVE. *Ph.D. dissertation, Fla. State Univ.* 198p. 1982. From Diss. Abstr. Int. B Sci. Eng. 43(7):2084. Jan. 1983. SFA 28(1)

83-000114 Condrey, R. E. INGESTION-LIMITED GROWTH OF AQUATIC ANIMALS: THE CASE FOR BLACKMAN KINETICS. *Can. J. Fish. Aquatic Sci.* 39(12):1585-1595. Dec. 1982. In English with French summ. SFA 28(1)
[Cent. Wetland Resour., La. State Univ., Baton Rouge 70803]

83-000115 Cravedi, J. and J. Tulliez. CHRONIC INGESTION OF SATURATED HYDROCARBONS BY RAINBOW TROUT: INFLUENCE OF DODECYLCYCLOHEXANE AND PRISTANE ON LIPID METABOLISM. *Arch. Environ. Contam. Toxicol.* 11(6):719-725. Nov. 1982. SFA 28(1)
[I.N.R.A., Lab. Rech. Additifs Aliment., 180, Chemin de Tournefeville, 31300-Toulouse, France]

83-000116 Danil'chenko, O. P. A COMPARISON OF THE REACTION OF FISH EMBRYOS AND PROLARVAE TO CERTAIN NATURAL FACTORS AND SYNTHESIZED COMPOUNDS. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 22(1):123-134. 1982. SFA 28(1)
[Biol. Fac., Moscow Univ., USSR] The action of various concentrations of natural compounds K_2CO_3, KNO_3, $MgSO_4$, $MnCl_2$, $Co(NO_3)_2$ and synthesized substances not

PHYSIOLOGY (CONTINUED)

83-000116 CONTINUED inherent in nature (tin and organophosphorus compounds) on the embryonic and prolarval development of four species of fish, loach, *Misgurnus fossilis*, carp, *Cyprinus carpio*, pike, *Esox lucius*, and ruffe, *Acerina cernua*, was studied. The reaction of embryos and prolarvae to solutions of natural compounds is of an adaptive nature, while their reaction to synthesized compounds shows merely tolerance.

83-000117 Dannevig, B. H. and K. R. Norum. CHOLESTEROL ESTERIFICATION AND LIPIDS IN BLOOD PLASMA OF THE CHAR (*SALMO ALPINUS* L.) DURING SEXUAL MATURATION. *Comp. Biochem. Physiol. B Comp. Biochem.* 73(4):771-777. 1982. SFA 28(1)
[Inst. Zoophysiol., P.O. Box 1051, Univ. Oslo, Blindern, Oslo 3, Norway]

83-000118 Darling, D. S.; W. W. Dickhoff and A. Gorbman. COMPARISON OF THYROID HORMONE BINDING TO HEPATIC NUCLEI OF THE RAT AND A TELEOST (*ONCORHYNCHUS KISUTCH*). *Endocrinology* 111(6):1943. Dec. 1982. SFA 28(1)
[Dep. Zool., Univ. Wash., Seattle 98195]

83-000119 Dasmahapatra, A. K. and A. K. Medda. EFFECT OF ESTRADIOL DIPROPIONATE AND TESTOSTERONE PROPIONATE ON THE GLYCOGEN, LIPID, AND WATER CONTENTS OF LIVER, MUSCLE, AND GONAD OF MALE AND FEMALE (VITELLOGENIC AND NONVITELLOGENIC) SINGI FISH (*HETEROPNEUSTES FOSSILIS* BLOCH). *Gen. Comp. Endocrinol.* 48(4):476-484. Dec. 1982. SFA 28(1)
[Dep. Anim. Physiol., Bose Inst., Calcutta 700 009, India]

83-000120 Dean, J. C. and G. L. Lucchetti. GROWTH AND HEPATIC ENZYME ACTIVITY IN WILD RAINBOW TROUT (*SALMO GAIRDNERI* RICHARDSON) FROM VIRGINIA. *Va. J. Sci.* 33(3):102. 1982. Abstract only. SFA 28(1)
[Dep. Fish. Wildl. Sci., VPI&SU, Blacksburg, VA 24061]

83-000121 DeVries, A. L. BIOLOGICAL ANTIFREEZE AGENTS IN COLDWATER FISHES. *Comp. Biochem. Physiol. A Comp. Physiol.* 73(4):627-640. 1982. SFA 28(1)
[Dep. Physiol. Biophys., Univ. Ill., Urbana 61801]

83-000122 Divert, G. M. and V. A. Matyukhin. FUNCTIONAL SPECIALIZATION OF RED AND WHITE MUSCLES IN THE BAIKAL BLACK GRAYLING, *THYMALLUS ARCTICUS BAICALENSIS* (THYMALLIDAE). *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 22(2):138-141. 1982. SFA 28(1)
[Inst. Physiol., Siberian Br., USSR Acad. Med. Sci., Novosibirsk, USSR]

83-000123 Duplinsky, P. D. SPERM MOTILITY OF NORTHERN PIKE AND CHAIN PICKEREL AT VARIOUS pH VALUES. *Trans. Am. Fish. Soc.* 111(6):768-771. Nov. 1982. SFA 28(1)
[Dep. Anim. Sci., Univ. R. I., Kingston 02881]

83-000124 Fabacher, D. L. HEPATIC MICROSOMES FROM FRESHWATER FISH--I. *IN VITRO* CYTOCHROME P-450 CHEMICAL INTERACTIONS. *Comp. Biochem. Physiol. C Comp. Pharmacol.* 73(2):277-283. 1982. SFA 28(1)
[U.S. FWS, Columbia Natl. Fish. Res. Lab., Rt. 1, Columbia, MO 65201]

PHYSIOLOGY (CONTINUED)

83-000125 Fremont, L. and D. Marion. A COMPARISON OF THE LIPOPROTEIN PROFILES IN MALE TROUT (*SALMO GAIRDNERI*) BEFORE MATURITY AND DURING SPERMIATION. *Comp. Biochem. Physiol. B Comp. Biochem.* 73(4):849-855. 1982. SFA 28(1)
[Stn. Rech. Nutr., INRA CNRZ 78350, Jouy-en-Josas, France]

83-000126 Fryer, J. N. and E. Leung. NEUROHYPOPHYSIAL HORMONAL CONTROL OF CORTISOL SECRETION IN THE TELEOST *CARASSIUS AURATUS*. *Gen. Comp. Endocrinol.* 48(4):425-431. Dec. 1982. SFA 28(1)
[Dep. Anat., Sch. Med., Fac. Health Sci., Univ. Ottawa, Ottawa K1N 9A9, Canada]

83-000127 Golovnev, L. N.; A. N. Kulikova; L. N. Yasinskaya and V. A. Sivolotskaya. COMPOSITION OF THE SERUM PROTEINS OF CARP, *CYPRINUS CARPIO*. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 22(2):92-97. 1982. SFA 28(1)
[BelrybNIIproekt, Minsk, USSR]

83-000128 Gras, J.; Gudefin, Y.; F. Chagny and H. Perrier. FREE AMINO ACIDS AND NINHYDRIN-POSITIVE SUBSTANCES IN FISH--II. CARDIO-RESPIRATORY SYSTEM: PLASMA, ERYTHROCYTES, HEART AND GILLS OF THE RAINBOW TROUT (*SALMO GAIRDNERII* RICHARDSON). *Comp. Biochem. Physiol. B Comp. Biochem.* 73(4):845-847. 1982. SFA 28(1)
[Fac. Pharm., Claude Bernard Univ., 8 Rockefeller Ave., 69373 Lyon Cedex 08, France]

83-000129 Grechanov, I. G. and V. M. Volodin. EXPERIMENTAL STUDY OF SPERM RESORPTION IN THE TESTES OF BREAM, *ABRAMIS BRAMA*, FROM RYBINSK RESERVOIR. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 21(6):158-162. 1981. SFA 28(1)
[Inst. Biol. Inland Waters, Acad. Sci. USSR, Borok, Yaroslavl Dist., USSR]

83-000130 Harrington, J. P. THERMOSTABILITY OF SALMON HEMOGLOBINS. *Comp. Biochem. Physiol. B Comp. Biochem.* 73(4):919-922. 1982. SFA 28(1)
[Dep. Chem., Univ. Alaska, Anchorage 99508]

83-000131 Hirji, K. N. and W. A. M. Courtney. LEUCINE AMINOPEPTIDASE ACTIVITY IN THE DIGESTIVE TRACT OF PERCH, *PERCA FLUVIATILIS* L. *J. Fish Biol.* 21(6):615-622. Dec. 1982. SFA 28(1)
[Dep. Zool., Univ. Dar es Salaam, P.O. Box 35064, Dar es Salaam, Tanzania]

83-000132 Hoffmann, R.; R. Lommel and M. Riedl. INFLUENCE OF DIFFERENT ANAESTHETICS AND BLEEDING METHODS ON HEMATOLOGICAL VALUES IN FISH. *Arch. Fischereiwiss.* 33(1-2):91-103. Nov. 1982. SFA 28(1)
[Inst. Zool. Hydrobiol., Univ. Munchen, West Germany]

83-000133 Holstein, B. and C. Haux. INHIBITION OF GASTRIC ACID SECRETION BY INTESTINAL AND PARENTERAL ADMINISTRATION OF A MIXTURE OF L-AMINO ACIDS IN THE ATLANTIC COD, *GADUS MORHUA*. *Acta Physiol. Scand.* 116(2):141-145. Oct. 1982. SFA 28(1)
[Dep. Zoophysiol., Univ. Göteborg, Box 250 59, S-400 31 Göteborg, Sweden]

PHYSIOLOGY (CONTINUED)

83-000134 Horder, T. J. and K. A. C. Martin. SOME DETERMINANTS OF OPTIC TERMINAL LOCALIZATION AND RETINOTOPIC POLARITY WITHIN FIBRE POPULATIONS IN THE TECTUM OF GOLDFISH. *J. Physiol. (Lond.)* 333:481-509. Dec. 1982. SFA 28(1)
[K.A.C. Martin: Dep. Exp. Psychol., South Parks Rd., Oxford OX1 3UD, England]

83-000135 Ivankov, V. N.; S. N. Padetskiy; V. S. Floryak; N. I. Churikova and Y. I. Gavrenkov. NEOTENIC FEMALES OF CHERRY SALMON, *ONCORHYNCHUS MASOU*, OF THE KRIVAYA RIVER (SOUTHERN PRIMORYE). *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 21(5):118-123. 1981. SFA 28(1)
[Far East State Univ., Vladivostok, USSR]

83-000136 Iwamoto, R. N. STRAIN-PHOTOPERIOD-TEMPERATURE INTERACTIONS IN COHO SALMON: FRESHWATER GROWTH, SMOLTIFICATION, AND SEAWATER ADAPTATION. *Ph.D. dissertation, Univ. Wash.* 401p. 1982. From Diss. Abstr. Int. B Sci. Eng. 43(6):1762. Dec. 1982. SFA 28(1)

83-000137 Jónás, E.; M. Rágyanszki; J. Oláh and L. Boross. PROTEOLYTIC DIGESTIVE ENZYMES OF CARNIVOROUS (*SILURUS GLANIS* L.), HERBIVOROUS (*HYPOPHTHALMICHTHYS MOLITRIX* VAL.) AND OMNIVOROUS (*CYPRINUS CARPIO* L.) FISHES. *Aquaculture* 30(1-4):145-154. Jan. 1983. SFA 28(1)
[Biochem. Dep. Attila József Univ., H-6726 Szeged, Hungary]

83-000138 Jezierska, B.; J. R. Hazel and S. D. Gerking. LIPID MOBILIZATION DURING STARVATION IN THE RAINBOW TROUT, *SALMO GAIRDNERI* RICHARDSON, WITH ATTENTION TO FATTY ACIDS. *J. Fish Biol.* 21(6):681-692. Dec. 1982. SFA 28(1)
[S.D. Gerking: Dep. Zool., Ariz. State Univ., Tempe 85287]

83-000139 Kalmijn, A. J. ELECTRIC AND MAGNETIC FIELD DETECTION IN ELASMOBRANCH FISHES. *Science* 218(4575):916-918. 26 Nov. 1982. SFA 28(1)
[Scripps Inst. Oceanogr., Univ. Calif., La Jolla 92093] Sharks, skates, and rays receive electrical information about the positions of their prey, the drift of ocean currents, and their magnetic compass headings. At sea, dogfish blue sharks were observed to execute apparent feeding responses to dipole electric fields designed to mimic prey. In training experiments, stingrays showed the ability to orient relative to uniform electric fields similar to those produced by ocean currents. Voltage gradients of only 5 nanovolts per centimeter would elicit either behavior.

83-000140 Kormanik, G. A. and D. H. Evans. THE RELATION OF Na AND Cl EXTRUSION IN *OPSANUS BETA*, THE GULF TOADFISH, ACCLIMATED TO SEAWATER. *J. Exp. Zool.* 224(2):187-194. 10 Dec. 1982. SFA 28(1)
[Dep. Biol., Univ. Miami, Coral Gables 33124]

83-000141 Kozlov, A. N. RELATIONSHIP BETWEEN INTENSITY AND PERIODS OF PROTEIN INCREASE AND FAT ACCUMULATION IN THE MARBLED NOTOTHENIA, *NOTOTHENIA ROSSI MARMORATA* (NOTOTHENIDAE). *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 21(5):99-102. 1981. SFA 28(1)
[VNIRO, Moscow, USSR]

PHYSIOLOGY (CONTINUED)

83-000142 Kozlov, A. N. SEASONAL DYNAMICS OF THE MORPHOPHYSIOLOGICAL AND BIOCHEMICAL INDICES OF *NOTOTHENIA GIBBERIFRONS*. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 22(1):101-106. 1982. SFA 28(1)
[VNIRO, Moscow, USSR]

83-000143 Kuz'mina, V. V.; A. G. Poddubnyy and D. Y. Landsberg. METHODS OF EVALUATING ENZYME ACTIVITY FOR STUDYING THE DIGESTION OF FISH AT THE POPULATION LEVEL. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 22(1):160-162. 1982. SFA 28(1)
[Inst. Biol. Inland Waters, USSR Acad. Sci., Borok, Yaroslavl Reg., USSR]

83-000144 Kychanov, V. M. and S. A. Leont'ev. SALT TOLERANCE AND FRACTION COMPOSITION OF HEMOGLOBIN IN YOUNG INCONNU *STENODUS LEUCICHTHYS*. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 21(6):128-134. 1981. SFA 28(1)
[Cent. Res. Inst. Sturgeon Farm., Astrakhan, USSR]

83-000145 Lapina, N. N. and V. I. Lapin. DYNAMICS OF PHYSIOLOGICAL-BIOCHEMICAL PARAMETERS OF REPRODUCTIVE SYNTHESIS IN SOME FEMALE CYPRINID FISHES. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 22(2):103-111. 1982. SFA 28(1)
[IEMEZH, Moscow, USSR]

83-000146 Lemons, D. E. and L. I. Crawshaw. THE ROLE OF ACCLIMATION TEMPERATURE IN THE INDUCTION OF TORPIDITY IN THE LARGEMOUTH BASS. *Acta Univ. Carolinae Biol.* 1979(3-4):353-356. Sept. 1981. SFA 28(1)
[Columbia Univ., Coll. Physician Surg., New York, NY]

83-000147 Lone, K. P. and B. W. Ince. CELLULAR GROWTH RESPONSES OF RAINBOW TROUT (*SALMO GAIRDNERI*) FED DIFFERENT LEVELS OF DIETARY PROTEIN, AND AN ANABOLIC STEROID ETHYLESTRENOL. *Gen. Comp. Endocrinol.* 49(1):32-49. Jan. 1983. SFA 28(1)
[B.W. Ince: Dep. Biol. Sci., Univ. Aston, Birmingham B4 7ET, England]

83-000148 Müller, U. and E. Schwartz. INFLUENCE OF SINGLE NEUROMASTS ON PREY LOCALIZING BEHAVIOR OF THE SURFACE FEEDING FISH, *APLOCHEILUS LINEATUS*. *J. Comp. Physiol. A Sens. Neural Behav. Physiol.* 149(3):399-408. Dec. 1982. SFA 28(1)
[Inst. Tierphsysiol., Univ. Giessen, Wartweg 95, D-6300 Giessen, West Germany]

83-000149 Makeyeva, A. P. and M. I. Zaki Mokhamed. THE REPRODUCTION AND DEVELOPMENT OF *PSEUDORASBORA PARVA* IN SOVIET CENTRAL ASIA. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 22(1):69-82. 1982. SFA 28(1)
[Biol. Fac., Moscow Univ., USSR] Data are presented on the embryonic and larval periods of life of *Pseudorasbora parva* ("Chinese chebachok"), a Far Eastern immigrant in the waters of Central Asia. The extensive establishment of this species became possible because of its high reproductive capacity, a number of embryonic-larval adaptations and protection of the eggs by the male. The reproductive features of *Pseudorasbora parva* can be classified as lithophilous and exhibiting parental care.

PHYSIOLOGY (CONTINUED)

83-000150 Mann, R. THE SEASONAL CYCLE OF GONADAL DEVELOPMENT IN *ARCTICA ISLANDICA* FROM THE SOUTHERN NEW ENGLAND SHELF. *NOAA Fish. Bull.* 80(2):315-326. Apr. 1982. SFA 28(1)
[Woods Hole Oceanogr. Inst., Woods Hole, MA 02543]

83-000151 Massoud, A. A. SEASONAL HISTOCHEMICAL CHANGES IN THE PITUITARY GLAND OF CHANNEL CATFISH, ICTALURUS PUNCTATUS (RAFINESQUE). *Ph.D. dissertation, Memphis State Univ.* 123p. 1982. From Diss. Abstr. Int. B Sci. Eng. 43(6):1763. Dec. 1982. SFA 28(1)

83-000152 Matias, J. R. EMBRYONIC DIAPAUSE IN ANNUAL FISHES: EVAPORATIVE WATER LOSS AND SURVIVIAL. *Experientia (Basel)* 38(11):1315-1317. 15 Nov. 1982. SFA 28(1)
[Orentreich Found. Adv. Sci., 910 Fifth Ave., New York, NY 10021]

83-000153 Matsubara, J. A. PHYSIOLOGICAL CELL TYPES IN THE POSTERIOR LATERAL LINE LOBES OF WEAKLY ELECTRIC FISH: NEURAL CORRELATES OF ELECTROLOCATION UNDER JAMMING. *J. Comp. Physiol. A Sens. Neural Behav. Physiol.* 149(3):339-351. Dec. 1982. SFA 28(1)
[Dep. Psychol., Dalhousie Univ., Halifax, NS B3H 4J1, Canada]

83-000154 McWilliams, P. G. AN INVESTIGATION OF THE LOSS OF BOUND CALCIUM FROM THE GILLS OF THE BROWN TROUT, *SALMO TRUTTA*, IN ACID MEDIA. *Comp. Biochem. Physiol. A Comp. Physiol.* 74(1):107-116. 1983. SFA 28(1)
[Dep. Biol. Sci., Univ. Lancaster, Lancashire LA1 4YQ, England]

83-000155 Morrow, W. J. W.; J. E. Harris and A. Pulsford. IMMUNOLOGICAL RESPONSES OF THE DOGFISH (*SCYLIORHINUS CANIULA* L.) TO CELLULAR ANTIGENS. *Acta Zool. (Stockh.)* 63(3):153-159. 1982. SFA 28(1)
[A. Pulsford: Mar. Biol. Assoc. U.K., Citadel Hill, Plymouth, Devon, England]

83-000156 Nonnotte, G.; D. A. Colin and L. Nonnotte. NA^+ AND CL^- TRANSPORT AND INTERCELLULAR JUNCTIONS IN THE ISOLATED SKIN OF A MARINE TELEOST (*BLENNIUS PHOLIS* L.). *J. Exp. Zool.* 224(1):39-44. 20 Nov. 1982. SFA 28(1)
[Lab. Physiol. Comp. Regul., C.N.R.S., B.P.20CR, 67037 Strasbourg-Cedex, France]

83-000157 O'Grady, S. M.; J. D. Schrag; J. A. Raymond and A. L. Devries. COMPARISON OF ANTIFREEZE GLYCOPEPTIDES FROM ARCTIC AND ANTARCTIC FISHES. *J. Exp. Zool.* 224(2):177-185. 10 Dec. 1982. SFA 28(1)
[Dep. Physiol. Biophys., Univ. Ill., Urbana 61801]

83-000158 Ono, R. D. PROPRIOCEPTIVE ENDINGS IN THE MYOTOMES OF THE PICKEREL (TELEOSTEI: ESOCIDAE). *J. Fish Biol.* 21(5):525-535. Nov. 1982. SFA 28(1)
[Dep. Anat., Univ. Mass. Med. Sch., 55 Lake Ave. North, Worcester 01605]

83-000159 Peter, R. E.; C. R. Paulencu and B. Breton. TEMPORAL RESPONSIVENESS OF THE OVARY OF GOLDFISH TO GONATROPIN. *J. Interdiscipl. Cycle Res.* 13(3):229-239. 1982. SFA 28(1)

PHYSIOLOGY (CONTINUED)

83-000160 Peters, G. THE EFFECT OF STRESS ON THE STOMACH OF THE EUROPEAN EEL, *ANGUILLA ANGUILLA* L. *J. Fish Biol.* 21(5):497-512. Nov. 1982. SFA 28(1)
[Inst. Hydrobiol. Fischereiwiss. Univ., Olbersweg 24, 2000 Hamburg 50, West Germany]

83-000161 Peterson, R. H. and D. J. Martin-Robichaud. WATER UPTAKE BY ATLANTIC SALMON OVA AS AFFECTED BY LOW pH. *Trans. Am. Fish. Soc.* 111(6):772-774. Nov. 1982. SFA 28(1)
[Dep. Fish. Oceans, Biol. Stn., St. Andrews, NB E0G 2X0, Canada]

83-000162 Prete, P. J. RESPONSES OF FISHES TO A LOW pH ENVIRONMENT. *M.S. thesis, North Tex. State Univ.* 73p. 1981. From Masters Abstr. 20(4):332. Dec. 1982. SFA 28(1)
Data were collected from natural and introduced fishes present in Ferndale Lake, a small (120 ha) sport fishing reservoir in Camp County, east Texas. Levels of pH measured in the lake during the study period ranged from 3.5 to 5.3. Monthly field surveys and experimental manipulations were designed to evaluate quantitatively the signs of stress at various biological levels. Lethal limits to low pH were quantified for largemouth bass (*Micropterus salmoides*) and bluegill (*Lepomis macrochirus*) to be pH 3.8 and 4.0, respectively. Mean blood pH (±1 SD) of 59 bluegill was 7.41 ± 0.16), with no significant difference ($P<0.05$) among groups from Ferndale Lake and Moss Lake (Cooke Co., Texas) under experimental conditions, even when severe stress was externally apparent. In a duel-trough horizontal pH gradient, bluegill behavioral avoidance was observed at pH levels below 7.0. Individual testing of 40 bluegill in pH gradient of 5.2 to 7.6 resulted in median occupation of pH 7.1, with an interquartile range of pH 6.9 to 7.3. Decreased community structure and population "well being" compared to early studies cannot be attributed entirely to recent acidic condition. Separating potential stress due to lake conditions from that due to heavy biotic predation by sport fishing in a small reservoir is difficult.

83-000163 Refstie, T. THE EFFECT OF FEEDING THYROID HORMONES ON SALTWATER TOLERANCE AND GROWTH RATE OF ATLANTIC SALMON. *Can. J. Zool.* 60(11):2706-2712. Nov. 1982. In English with French summ. SFA 28(1)
[Dep. Anim. Genet. Breed., Agric. Univ. Norway, Ås-NLH, Norway] Two experiments, involving the addition of thyroid hormones to the diet of salmon parr (*Salmo salar*) were carried out. The prime purpose of these experiments was to study the effect of feeding thyroid hormones on saltwater tolerance. Saltwater tolerance is interrelated with size and therefore growth rate was investigated. In experiment I three different thyroid preparations were used: thyroid extract, 3,5,3'-triiodo-L-thyronine (T_3), and thyroxine (T_4). Each thyroid preparation was fed to two different sizes of fish with two different concentrations in the diet. T_3 gave the best overall results, both for saltwater tolerance and growth rate. No interaction was found between fish size and concentration of thyroid hormone in the diet. In experiment II three different concentrations of T_3 in the diet were fed to salmon parr of two different ages. Feeding T_3 improved saltwater tolerance and growth rate of 7-month-old fish but had a negative effect upon growth for 19-month-old fish. For the 7-month-old fish 10 mg T_3/kg dry food gave the best effect on saltwater tolerance, while 1 mg T_3/kg dry food was enough to improve growth. It is concluded that it is possible to induce smoltification in underyearling Atlantic salmon out of season by feeding thyroid hormones.

83-000164 Reimer, G. THE INFLUENCE OF DIET ON THE DIGESTIVE ENZYMES OF THE AMAZON FISH MATRINCHÃ, *BRYCON CF. MELANOPTERUS*. *J. Fish Biol.* 21(6):637-642. Dec. 1982. SFA 28(1)
[Zool. Inst., Univ. Wein, Althanstr. 14, Austria]

PHYSIOLOGY (CONTINUED)

83-000165 Reinhard, F. G. SUPPRESSION OF DNA- AND PROTEIN BIOSYNTHESIS IN CELL CULTURES BY A PEPTIDE ISOLATED FROM THE BRAIN OF AESTIVATING LUNGFISH *PROTOPTERUS*. *Acta Univ. Carolinae Biol.* 197(3-4):275-276. Sept. 1981. SFA 28(1)
[Max Planck Inst. Biochem., Martinried bei München, West Germany]

83-000166 Rombout, J. H. W. M. and J. J. Taverne-Thiele. AN IMMUNOCYTOCHEMICAL AND ELECTRON-MICROSCOPICAL STUDY OF ENDOCRINE CELLS IN THE GUT AND PANCREAS OF A STOMACHLESS TELEOST FISH, *BARBUS CONCHONIUS* (CYPRINIDAE). *Cell Tissue Res.* 227(3):577-593. 1982. SFA 28(1)
[Agric. Univ., Dep. Exp. Anim. Morphol. Cell Biol., Wageningen, The Netherlands]

83-000167 Rottiers, D. V. and R. M. Tucker. PROXIMATE COMPOSITION AND CALORIC CONTENT OF EIGHT LAKE MICHIGAN FISHES. *U.S. Fish Wildl. Serv. Tech. Pap.* 108. 8p. 1982. SFA 28(1)
[U.S. FWS, R.D. 4, Box 47A, Wellsboro, PA 16901]

83-000168 Scott, A. P.; J. P. Sumpter and P. A. Hardiman. HORMONE CHANGES DURING OVULATION IN THE RAINBOW TROUT (*SALMO GAIRDNERI* RICHARDSON). *Gen. Comp. Endocrinol.* 49(1):128-134. Jan. 1983. SFA 28(1)
[Minist. Agric. Fish Food, Dir. Fish. Res., Fish Lab., Lowestoft, Suffolk NR33 0HT, England]

83-000169 Shubina, L. I. and T. L. Rychagova. DYNAMICS OF FAT AND WATER METABOLISM IN CASPIAN SHAD, *ALOSA CASPIA CASPIA*, IN RELATION TO ITS BIOLOGICAL PECULIARITIES. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 21(6):123-127. 1981. SFA 28(1)
[VNIRO, Moscow, USSR]

83-000170 Sire, J. RÉGÉNÉRATION DES ÉCAILLES D'UN CICHLIDÉ, *HEMICHROMIS BIMACULATUS* (GILL) (TÉLÉOSTÉEN, PERCIFORME). I. MORPHOGENÈSE, STRUCTURE ET MINÉRALISATION. [REGENERATION OF SCALES IN A CICHLID, *HEMICHROMIS BIMACULATUS* (GILL) (TELEOSTEI, PERCIFORMES). I. MORPHOGENESIS, STRUCTURE AND MINERALIZATION.] *Ann. Sci. Nat. (Zool.)* 4(3):153-169. July-Sept. 1982. In French with English summ. SFA 28(1)
[Lab. Anat. Comp., Univ. Paris 7, 2, Place Jussieu, F 75005 Paris, France]

83-000171 Solanki, T. G. and M. Benjamin. CHANGES IN THE MUCOUS CELLS OF THE GILLS, BUCCAL CAVITY AND EPIDERMIS OF THE NINE-SPINED STICKLEBACK, *PUNGITIUS PUNGITIUS* L., INDUCED BY TRANSFERRING THE FISH TO SEA WATER. *J. Fish Biol.* 21(5):563-575. Nov. 1982. SFA 28(1)
[Dep. Anat., Univ. Coll., Cathays Park, Cardiff CF1 1XL, Wales]

83-000172 Soofiani, N. M. and A. D. Hawkins. ENERGETIC COSTS AT DIFFERENT LEVELS OF FEEDING IN JUVENILE COD, *GADUS MORHUA* L. *J. Fish Biol.* 21(5):577-592. Nov. 1982. SFA 28(1)
[Mar. Lab., Aberdeen, Scotland] The energetic costs associated with feeding by juvenile cod were determined by means of an open-circuit respirometer. Fish acclimated to several temperatures (7, 10, 15 and 18°C) were kept at natural lighting levels, and fed inside their individual respirometers. They consumed a diet compounded from natural foods, at five different ration levels, their oxygen comsumption being monitored continually over an 11-16

PHYSIOLOGY (CONTINUED)

83-000172 CONTINUED day period. After each meal the rate of oxygen consumption increased to above the pre-feeding level, reaching a peak 8-10 h later. With each successive meal the oxygen consumption showed a cumulative increase, reaching a maximum usually after the last meal. The elevation in metabolic rate associated with feeding was dependent upon ration size, increasing linearly as the food intake increased. The effect was also dependent upon temperature; for fish fed to satiation the total energy cost was equivalent to 11.9, 10.9, 16.4 and 17.1% of the ingested energy at 7, 10, 15 and 18°C respectively. For resting satiated fish the rate of oxygen consumption was close to the maximum rate for active fish.

83-000173 Spannhof, L. and H. Plantikow. STUDIES ON CARBOHYDRATE DIGESTION IN RAINBOW TROUT. *Aquaculture* 30(1-4):95-108. Jan. 1983. SFA 28(1)
[Anim. Physiol. Unit, Dep. Biol., Wilhelm Pieck Univ., Rostock, West Germany] Trout are poor starch digesters. The reason for the different digestibilities of carbohydrates were investigated and discussed. The inclusion of soluble starch products in the diet increases the volume of intestinal juices. Crude starch in the diet reduces amylase activity, amylase is adsorbed to crude starch so that starch hydrolysis is inhibited. Crude starch accelerates the passage through the intestine, thus reducing the time availabel for absorption.

83-000174 Spanovskaya, V. D. and V. I. Lapin. ECOLOGY OF *CYCLOTHONE MICRODON* IN THE SOUTHERN PART OF THE PACIFIC OCEAN. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 21(6):33-37. 1981. SFA 28(1)
[Biol. Fac., Moscow State Univ., USSR] *Cyclothone microdon* displays significant geographic variability. In the process of movement of the populations of this species from the lower to the higher latitudes, the maximum length of the fishes and their coefficient of condition increase, and the biochemical composition and liquid content of the body also change. In the Antarctic waters, this species attains maximum length and filling, but loses capacity for reproduction.

83-000175 Sullivan, K. M. THE BIOENERGETICS OF THE SABLEFISH *ANOPLOPOMA FIMBRIA* OCCURRING OFF SOUTHERN CALIFORNIA AND ENERGY ALLOCATION DURING LOW-FREQUENCY FEEDING IN DEEP-LIVING BENTHOPELAGIC FISHES. *Ph.D. dissertation, Univ. Calif. (San Diego)* 253p. 1982. From Diss. Abstr. Int. B Sci. Eng. 43(5):1332. Nov. 1982. SFA 28(1)

83-000176 Talbot, C. and P. J. Higgins. OBSERVATIONS ON THE GALL BLADDER OF JUVENILE ATLANTIC SALMON *SALMO SALAR* L., IN RELATION TO FEEDING. *J. Fish Biol.* 21(6):663-669. Dec. 1982. SFA 28(1)
[Freshwater Fish. Lab., Pitlochry, Scotland]

83-000177 Taylor, E. W. and P. J. Butler. NERVOUS CONTROL OF HEART RATE: ACTIVITY IN THE CARDIAC VAGUS OF THE DOGFISH. *J. Appl. Physiol. Respir. Environ. Exercise Physiol.* 53(6):1330-1335. Dec. 1982. SFA 28(1)
[Dep. Zool. Comp. Physiol., Univ. Birmingham, Birmingham B15 2TT, England]

83-000178 Thomas, S. and G. M. Hughes. EFFECTS OF HYPOXIA ON BLOOD GAS AND ACID-BASE PARAMETERS OF SEA BASS. *J. Appl. Physiol. Respir. Environ. Exercise Physiol.* 53(6):1336-1341. Dec. 1982. SFA 28(1)
[Lab. Physiol. Anim., Univ. Bretagne Occidentale, Brest, France]

PHYSIOLOGY (CONTINUED)

83-000179 Tirri, R. and P. Ripatti. INHIBITORY ADRENERGIC CONTROL OF HEART RATE OF PERCH (*PERCA FLUVIATILIS*) IN VITRO. *Comp. Biochem. Physiol. C Comp. Pharmacol.* 73(2):399-401. 1982. SFA 28(1)
[Lab. Anim. Physiol., Dep. Biol., Univ. Turku, 20500 Turku 50, Finland]

83-000180 Vigh-Teichmann, I.; H.-W. Korf; A. Oksche and B. Vigh. OPSIN-IMMUNOREACTIVE OUTER SEGMENTS AND ACETYLCHOLINESTERASE-POSITIVE NEURONS IN THE PINEAL COMPLEX OF *PHOXINUS PHOXINUS* (TELEOSTEI, CYPRINIDAE). *Cell Tissue Res.* 227(2):351-369. Nov. 1982. SFA 28(1)
[Dep. Anat. Cytobiol., Justus Liebig Univ., Giessen, West Germany]

83-000181 Weigand, M. D. and D. R. Idler. SYNTHESIS OF LIPIDS BY THE RAINBOW TROUT (*SALMO GAIRDNERI*) OVARY *IN VITRO*. *Can. J. Zool.* 60(11):2683-2693. Nov. 1982. In English with French summ. SFA 28(1)
[Mar. Sci. Res. Lab., Memorial Univ. Newfoundland, St. John's NF A1C 5S7, Canada]

83-000182 Woo, N. Y. S. and R. S. S. Wu. METABOLIC AND OSMOREGULATORY CHANGES IN RESPONSE TO REDUCED SALINITIES IN THE RED GROUPER, *EPINEPHELUS AKAARA* (TEMMINCK & SCHLEGEL), AND THE BLACK SEA BREAM, *MYLIO MACROCEPHALUS* (BASILEWSKY). *J. Exp. Mar. Biol. Ecol.* 65(2):139-161. 26 Nov. 1982. SFA 28(1)
[Dep. Biol., Chinese Univ. Hong Kong, Shatin, N.T., Hong Kong]

83-000183 Young, G.; H. Kagawa and Y. Nagahama. OOCTYE MATURATION IN THE AMAGO SALMON (*ONCORHYNCHUS RHODURUS*): IN VITRO EFFECTS OF SALMON GONADOTROPIN, STEROIDS, AND CYANOKETONE (AN INHIBITOR OF 3ß-HYDROXY-Δ^5-STEROID DEHYDROGENASE). *J. Exp. Zool.* 224(2):265-275. 10 Dec. 1982. SFA 28(1)
[Lab. Reprod. Biol., Natl. Inst. Basic Biol., Okazaki 444, Japan]

83-000184 Zenzerov, V. S. MORPHOFUNCTIONAL CHANGES IN THE THYROID GLAND OF THE CAPELIN, *MALLOTUS VILLOSUS VILLOSUS*, UNDER EXPERIMENTAL CONDITIONS. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 22(1):83-88. 1982. SFA 28(1)
[Murmansk Inst. Mar. Biol., Kola Br. USSR Acad. Sci., Dal'niye Zelentsy, USSR]

GENETICS, VARIATION STUDIES AND HYBRIDIZATION

83-000185 Bianco, P. G. HYBRIDIZATION BETWEEN *ALBURNUS ALBIDUS* (C.) AND *LEUCISCUS CEPHALUS CABEDA* R. IN ITALY. *J. Fish Biol.* 21(5):593-603. Nov. 1982. SFA 28(1)
[Ist. Zool. Univ., 67100 L'Aquila, Italy]

83-000186 Brown, K. L. DEMOGRAPHIC AND GENETIC CHARACTERISTICS OF DISPERSAL IN THE MOSQUITOFISH, *GAMBUSIA AFFINIS* (FAMILY POECILIIDAE). *Ph.D. dissertation, Univ. Ga.* 178p. 1982. From Diss. Abstr. Int. B Sci. Eng. 43(6):1720. Dec. 1982. SFA 28(1)

83-000187 D'yakov, Y. P.; E. Z. Koval' and L. V. Bogdanov. INTERSPECIES BIOCHEMICAL POLYMORPHISM AND POPULATION STRUCTURE OF THE GREENLAND HALIBUT *REINHARDTIUS HIPPOGLOSSOIDES* WALBAUM (PLEURONECTIDAE) IN THE BERING SEA

GENETICS, VARIATION STUDIES AND HYBRIDIZATION (CONTINUED)

83-000187 CONTINUED AND THE SEA OF OKHOTSK. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 21(5):29-35. 1981. SFA 28(1)
[TINRO, Vladivostok, USSR]

83-000188 Dorofeyeva, Y. A. and R. G. Rukhkyan. DIVERGENCE OF THE SEVAN TROUT, *SALMO ISCHCHAN*, IN THE LIGHT OF KARYOLOGICAL AND MORPHOLOGICAL DATA. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 22(1):23-36. 1982. SFA 28(1)
[Zool. Inst., USSR Acad. Sci., Leningrad, USSR]

83-000189 Gomel'skii, B. I. and N. B. Cherfas. HORMONAL INVERSION OF SEX AS A METHOD OF STUDYING THE GENETIC REGULATION OF NATURAL GYNOGENESIS IN FISH. *Dokl. Biol. Sci. (Engl. Transl. Dokl. Akad. Nauk SSSR Ser. Biol.)* 263(1-6):153-155. Sept. 1982. SFA 28(1)
[All-Union Res. Inst. Pond Fish., Rybnoe, Moscow, USSR]

83-000190 Hatfield, J. S.; T. E. Wissing; S. I. Guttman and M. P. Farrell. ELECTROPHORETIC ANALYSIS OF GIZZARD SHAD FROM THE LOWER MISSISSIPPI RIVER AND OHIO. *Trans. Am. Fish. Soc.* 111(6):742-748. Nov. 1982. SFA 28(1)
[Dep. Zool., Miami Univ., Oxford, OH 45056]

83-000191 Kornfield, I.; B. D. Sidell and P. S. Gagnon. STOCK DEFINITION IN ATLANTIC HERRING (*CLUPEA HARENGUS HARENGUS*): GENETIC EVIDENCE FOR DISCRETE FALL AND SPRING SPAWNING POPULATIONS. *Can. J. Fish. Aquatic Sci.* 39(12):1610-1621. Dec. 1982. In English with French summ. SFA 28(1)
[Migratory Fish Res. Inst., Univ. Me., Orono 04469]

83-000192 Krysanov, E. Y. and V. N. Elovenko. STRUCTURAL PECULIARITIES OF THE KARYOTYPE OF THE AMUR "SLEEPER" *PERCCOTTUS GLEHNI* (ELEOTRIDAE) IN DIFFERENT PARTS OF ITS RANGE. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 21(5):124-127. 1981. SFA 28(1)
[Inst. Ecol. Morphol. Ecol. Anim., Acad. Sci. USSR-IEMEZH, Moscow, USSR]

83-000193 McAndrew, B. J. and K. C. Majumdar. TILAPIA STOCK IDENTIFICATION USING ELECTROPHORETIC MARKERS. *Aquaculture* 30(1-4):249-261. Jan. 1983. SFA 28(1)
[Inst. Aquacult., Univ. Stirling, Stirling, England] With the difficulties in the identification of the many tilapia species, a reliable method independent of morphological characteristics was needed to define the nature of the cultured stocks throughout the world. Starch gel electrophoresis of various body tissues and the resolution of protein loci using specific histochemical techniques has shown that a large amount of co-dominant interspecific variation exists which may be used to identify unequivocally the nine different species studied. The technique and relevant buffer systems and stains are described together with an account of the enzymes observed and their interpretation. The results are expressed as relative mobilities of the observed isozyme bands, allowing direct comparison between all the species studied. The potential of the technique is discussed regarding its possibilities in tilapia culture and in the general genetic improvement of stocks.

GENETICS, VARIATION STUDIES AND HYBRIDIZATION (CONTINUED)

83-000194 Ráb, P. and P. Liehman. CHROMOSOME STUDY OF THE DANUBE SALMON *HUCHO HUCHO* (PISCES, SALMONIDAE). *Folia Zool.* 31(2):181-190. 1982. In English with Czech summ. SFA 28(1)
[Inst. Anim. Physiol. Genet., Dep. Genet., Czech. Acad. Sci., Liběchov, Czechoslovakia]

83-000195 Severin, S. O. and Y. A. Zinov'yev. KARYOTYPES OF ISOLATED POPULATIONS OF *THYMALLUS ARCTICUS* FROM THE OB RIVER BASIN. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 22(1):13-22. 1982. SFA 28(1)
[Perm Univ., USSR]

83-000196 Shaklee, J. B.; C. S. Tamaru and R. S. Waples. SPECIATION AND EVOLUTION OF MARINE FISHES STUDIED BY THE ELECTROPHORETIC ANALYSIS OF PROTEINS. *Pac. Sci.* 36(2):141-157. Apr. 1982. SFA 28(1)
[CSIRO, Mar. Lab., P.O. Box 120, Cleveland, Queensland 4163, Australia]

BEHAVIOR

83-000197 Abalmazova, M. G.; O. M. Zaporozhets; L. A. Balayev and A. V. Orlov. THE EFFECT OF WEAK MAGNETIC AND ELECTRIC FIELDS ON THE BLACK SEA SURMULLET, *MULLUS BARBATUS PONTICUS*. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 22(1):114-122. 1982. SFA 28(1)
[VNIRO, Moscow, USSR]

83-000198 Clady, M. D. and G. W. Luker. COMPETITION BETWEEN SPOTTED AND LARGEMOUTH BASS IN VARIABLE POND ECOSYSTEMS. *Trans. Am. Fish. Soc.* 111(6):665-674. Nov. 1982. SFA 28(1)
[U.S. For. Serv., P.O. Box 400, Waldport, OR 97394]

83-000199 Doherty, P. J. SOME EFFECTS OF DENSITY ON THE JUVENILES OF TWO SPECIES OF TROPICAL, TERRITORIAL DAMSELFISH. *J. Exp. Mar. Biol. Ecol.* 65(3):249-261. 17 Dec. 1982. SFA 28(1)
[Aust. Inst. Mar. Sci., P.M.B. 3, Townsville M.S.O., Queensland 4810, Australia]

83-000200 Glukhov, A. A. and M. L. Zaferman. OBSERVATIONS OF THE BEHAVIOR OF *POLYPRION AMERICANUS* (SERRANIDAE). *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 22(2):142-144. 1982. SFA 28(1)
[PINRO, Murmansk, USSR]

83-000201 Hairston, N. G., Jr. and S. S. Easter, Jr. FISH VISION AND THE DETECTION OF PLANKTONIC PREY. *Science* 218(4578):1240-1242. 17 Dec. 1982. SFA 28(1)
[Dep. Zool., Univ. R.I., Kingston 02881] Planktivorous sunfish of various sizes were studied to ascertain whether growth-related changes in the retina are related to the ability to capture small planktonic crustaceans. Behaviorally, the larger fish detected and captured crustaceans that subtended smaller visual angles. Histological examination of the retinas revealed that the distance between cones, measured in minutes of visual angle, decreased as the animals grew, suggesting that the larger retinas could resolve smaller objects. There correlated behavioral and anatomical results suggest that improved visual resolutions contributes to improved

BEHAVIOR (CONTINUED)

83-000201 CONTINUED predation. This finding provides a selective advantage for the continuous retinal growth noted in many fish.

83-000202 Hall, L. W., Jr.; D. T. Burton and P. R. Abell. THERMAL RESPONSES OF ATLANTIC SILVERSIDES (*MENIDIA MENIDIA*) ACCLIMATED TO CONSTANT AND ASYMMETRIC FLUCTUATING TEMPERATURES. *Arch. Hydrobiol.* 94(3):318-325. 1982. SFA 28(1)

[Johns Hopkins Univ., Appl. Phys. Lab., Aquatic Ecol. Sect., Shady Side, MD 20764] The objective of this study was to assess the thermal responses of Atlantic silversides, *Menidia menidia*, acclimated to 5 and 15°C constant temperatures and three different asymmetric fluctuating thermal regimes for a period of 31 days. The critical thermal maximum (CTM) was used as the response criterion. Daily cyclic thermal conditions were obtained by lowering temperatures from 15 to 5°C over a period of 1.5, 11.25 and 22.5 hours; temperatures were then increased to the original 15°C in a 1.5 hour period. At most cycling intervals, CTM values for fish acclimated to fluctuating temperatures fell between the CTM values for fish acclimated to the upper and lower constant acclimation temperatures. Generally the values were closer to those of fish acclimated to the maximum (15°C) of the temperature cycle than to the minumum (5°C). It appears that Atlantic silversides do not readily acclimate toward lower temperatures under low cycling conditions.

83-000203 Hunter, J. R. and K. M. Coyne. THE ONSET OF SCHOOLING IN NORTHERN ANCHOVY LARVAE, *ENGRAULIS MORDAX*. *Calif. Coop. Oceanic Fish. Invest.* 23:246-251. Oct. 1982. SFA 28(1)

[NMFS, Southwest Fish. Cent., La Jolla, CA 92038]

83-000204 Kasumyan, A. O. and N. I. Pashchenko. THE ROLE OF OLFACTION IN THE DEFENSE REACTION OF GRASS CARP, *CTENOPHARYNGODON IDELLA* (CYPRINIDAE), TO ALARM PHEROMONE. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 22(2):122-126. 1982. SFA 28(1)

In fish exposed to the detergent triton-x--100, the sensitivity to the alarm pheromone decreased by 8 or 9 orders of magnitude. These results indicate that the defense reaction to alarm pheromone occurs through olfaction.

83-000205 Malyukina, G. A.; V. I. Martem"yanov and G. I. Flerova. THE ALARM PHEROMONE AS A STRESS FACTOR FOR FISH. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 22(2):147-150. 1982. SFA 28(1)

[Moscow State Univ., USSR]

83-000206 Ovchinnikov, V. V. SUN-COMPASS RESPONSE AND POSSIBILITY OF SUN ORIENTATION OF FISHES. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 21(6):141-150. 1981. SFA 28(1)

[AtlantNIRO, Kaliningrad, USSR] Solar compass response of the juvenile common eel, *Anguilla anguilla*, was studied in two geographically separated regions and new results have been examined in relation with the possibility of sun orientation of marine and fresh water fishes. Manifestation of this response is observed in the presence of dense cloudiness as well as in the surface layers of water by the perception of the polarized sun light.

83-000207 Schlosser, I. J. FISH COMMUNITY STRUCTURE AND FUNCTION ALONG TWO HABITAT GRADIENTS IN A HEADWATER STREAM. *Ecol. Monogr.* 52(4):395-414. Dec. 1982. SFA 28(1)

[Dep. Biol., Univ. N. Dak., Grand Forks 58202]

BEHAVIOR (CONTINUED)

83-000208 Schmitz, W. and G. O. Schuman. DIE SOMMERLICHEN WASSERTEMPERATUREN DER ÄSCHENZONE MITTELEUROPÄISCHER FLIEßGEWÄSSER. [WATER TEMPERATURES OF THE *THYMALLUS*-ZONE OF MIDDLE EUROPEAN RUNNING WATERS IN SUMMER.] *Arch. Hydrobiol.* 95:435-443. 1982. In German with English summ. SFA 28(1)
[Kirchbergstraße 32, 7504 Weingarten, West Germany]

83-000209 Shparkovskiy, I. A.; I. D. Pavlov; N. V. Troshicheva and D. V. Klets. RESPONSE OF PINK SALMON, *ONCORHYNCHUS GORBUSCHA*, AND ATLANTIC SALMON, *SALMO SALAR*, TO ANIMO ACIDS DURING SPAWNING MIGRATION. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 21(6):135-140. 1981. SFA 28(1)
[Murmansk Inst. Mar. Biol., Dal'nie Zelentsy, USSR] Pink salmon and Atlantic salmon, migrating to spawn, have a capacity to perceive amino acid solutions in the concentrations of 10^{-5}M. Individual amino acids cause positive or negative mobility responses under conditions of free behavior. The nature of response depends upon the type and structure of the amino acids. Carbohydrates do not show significant effect on the behavior of pink salmon and Atlantic salmon during the period of spawning migration.--Concl.

83-000210 Tursch, B. CHEMICAL PROTECTION OF A FISH (*ABUDEFDUF LEUCOGASTER* BLEEKER) BY A SOFT CORAL (*LITOPHYTON VIRIDIS* MAY). *J. Chem. Ecol.* 8(11):1421-1428. Nov. 1982. SFA 28(1)
[Collect. Bio-Ecol., Fac. Sci., Univ. Libre de Bruxelles, Brussels, Belgium] Around Laing Island (Bismarck Sea), juveniles of the fish *Abudefduf leucogaster* are associated with the alcyonarian *Litophyton viridis* which, on mechanical stimulation, can release a potent ichthyotoxin and appears to be accordingly disliked by large predators. The fish has no special immunity to high levels of toxin but is affected more slowly than others. This has been interpreted in terms of an original strategy whereby *A. leucogaster* plays its long reaction time against the diffusion of the toxin, allowing the fish to remain around the soft coral and benefit from indirect chemical protection. Possible biological implications of the toxin release are discussed.

83-000211 Vinogradova, V. M. and Y. B. Manteyfel. THE ROLE OF CHEMICAL SIGNALS AND OLFACTION IN THE SEXUAL BEHAVIOR OF THE GUPPY, *POECILLA RETICULATA* (CYPRINODOTIFORMES, POECILIIDAE). *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 22(1):107-113. 1982. SFA 28(1)
[IEMEZh, Moscow, USSR] In intact and blinded males of the guppy, *Poecilia reticulata*, a marked preference was noted for water in which females had been kept. Elements of sexual behavior were provoked by this water. Water in which males or females had been kept did not attract females. The olfactory system of the males is a major significance in their reception of chemical signals from females. Successful realization of the sexual behavior of male guppies also depends on visual reception.

83-000212 Wright, D. E. and A. Eastcott. ASSOCIATION OF AN ACOUSTIC SIGNAL WITH OPERANT CONDITIONED FEEDING RESPONSES IN THICKLIPPED MULLET, *CRENIMUGIL LABROSUS* (RISSO) AND COMMON CARP, *CYPRINUS CARPIO* (L.). *J. Fish Biol.* 21(6):693-698. Dec. 1982. SFA 28(1)
[Dep. Biol. Sci., Plymouth Polytech., Drake Circus, Plymouth, Devon, England]

LIFE HISTORY-GENERAL WORKS

83-000213 Bailey, K. M.; R. C. Francis and P. R. Stevens. THE LIFE HISTORY AND FISHERY OF PACIFIC WHITING, *MERLUCCIUS PRODUCTUS*. *Calif. Coop. Oceanic Fish. Invest.* 23:81-98. Oct. 1982. SFA 28(1)
[Coll. Fish., Univ. Wash., Seattle 98195]

83-000214 Berra, T. M. LIFE HISTORY OF THE AUSTRALIAN GRAYLING, *PROTOTROCTES MARAENA* (SALMONIFORMES: PROTOTROCTIDAE) IN THE TAMBO RIVER, VICTORIA. *Copeia* 1982(4):795-805. 21 Dec. 1982. SFA 28(1)
[Dep. Zool., Ohio State Univ., Mansfield 44906] During an 11 month study 1,479 Australian grayling, *Prototroctes maraena*, were collected, and the life cycle of the species was elucidated. Spawning takes place in the freshwater mid-reaches of the Tambo River during late April-early May (Fall 1979). The eggs are demersal and non-adhesive. The newly hatched fry are presumably swept downstream to brackish water in an estuary or to the ocean where they remain for about six months. During November juveniles ascend to the mid-reaches of the river where they spend the rest of their lives. Most (88%) grayling die before depositing a third annulus on their scales. The largest grayling examined was 231 mm standard length. Males may spawn during their first year, females require two years in fresh water. The oldest fish collected had five annuli and well-developed gonads. Mature females produced an average of 47,000 eggs and have a Gonadosomatic Index of about 27% near spawning time. Mature males develop breeding tubercles on the scales and fin rays when the GSI reaches 5.7%. As much as 12% of a ripe male's body weight may be testis. The breeding season of this schooling species is short and synchronized: gonadal development begins in mid-March, reaches a peak in late April and declines by early May. The cause of an apparent decline-abundance cycle in grayling populations may reflect its complex life cycle and high fecundity. Several difficult environmental years in succession (typical of Australia) could decimate the grayling population. The survivors could explosively exploit succeeding favorable years.

83-000215 Denoncourt, R. F. and J. F. A. Messersmith. GROWTH AND REPRODUCTION OF THE SATINFIN SHINER, *NOTROPIS ANALOSTANUS*, CODORUS CREEK, PENNSYLVANIA. *Proc. Pa. Acad. Sci.* 56(1):81-86. 1982. SFA 28(1)
[Dep. Biol. Sci., York Coll. Pa., York 17405] Over 1014 satinfin shiner, *Notropis analostanus*, were used to study sex-ratio, condition factor, ovary and ova development, fecundity, tuberculation, coloration and age and growth of this species in Codorus Creek, Pennsylvania. Satinfin shiner appeared to have a normal life span of three years (II^+) with a few reaching III^+. Annulus formation for most occurred in June. Mean fork length for the I^+ age group was 58.6 mm, II^+ 67.0, and III^+ 84.0. Length frequency distributions by sex were not significantly different for I^+ and II^+ age groups, indicating similar growth rates within each sex. Tuberculation in females and yellow coloration in males were recorded for the first time. Significantly fewer males occurred in the 51-70mm size group in spring (ratio 1:2) and in all specimens combined for 1976 (ratio 1:1.4). Condition factors for females were generally higher and decreased after spawning. The II^+ age group (both sexes) had higher condition factors in May and June, the 51-70mm size group higher than other size groups. Ovary development, based on mean gonosomatic indices, and the mean ova diamter were maximum in June. Maximum tuberculation in males and females recorded in June, and "running-ripe" females collected 26 June and 3 July, indicated peak spawning in the last week of June and first week of July. Coloration on males and females and length frequency distributions suggested a spawning season that begins prior to this and may extend through July. Ova counts from right and left ovaries were not significantly different and mean potential fecundity for 1976 was 1506 eggs (residual 629, actual 877).

LIFE HISTORY-GENERAL WORKS (CONTINUED)

83-000216 Dingyuan, D.; Z. Yuling and H. Haoming. [BIOLOGICAL STUDIES OF THE FAR-EASTERN DACE, *LEUCISCUS BRANDTI* (DYBOWSKI), IN TUMEN RIVER.] *Acta Zool. Sin.* 28(3):283-292. Sept. 1982. In Chinese with English summ. SFA 28(1)

[Inst. Zool., Acad Sinica, China]

83-000217 Dorr, J. A. III. SUBSTRATE AND OTHER ENVIRONMENTAL FACTORS IN REPRODUCTION OF THE YELLOW PERCH (*PERCA FLAVESCENS*). *Ph.D. dissertation, Univ. Mich.* 292p. 1982. From Diss. Abstr. Int. B Sci. Eng. 43(6):1703. Dec. 1982. SFA 28(1)

Field studies were conducted during 1980-1981 to evaluate the hypothesis that the yellow perch in southeastern Lake Michigan spawn preferentially on rough rather than smooth substrate, and to study effects of environmental factors on reproduction and early life history of this fish. Gillnetting and direct observation revealed males concentrated during early May at 6-12 m on rough substrate, i.e., till, clayey till, and riprap (artificial substrate). Few females occurred at depths less than 18 m until late May, then were abundant on reefs where spawning took place during 1-2 wk in late May-early June. The adults dispersed into surrounding areas after spawning, but remained more concentrated about reefs than in surrounding waters throughout summer. Feeding recommenced soon after spawning; fish, primarily the alewife and rainbow smelt comprised the bulk of the diet supplemented by crayfish and snails. Multiple linear regression of catch-per-effort against day number, a measure of substrate conditions, water temperature, photoperiod, and gonad maturation explained 60% of the variability in catch; substrate alone accounted for 30-40%. Divers observed perch egg masses deposited exclusively on rough substrate in densities as high as 184/1000 m^2, but usually less than 10/1000 m^2 which suggested that spawning was not substrate-limited. Egg masses collected and planted by divers at 6 and 9 m were transported by currents from smooth (sandy) substrate areas within 24 h, but not from rough bottom where the rugosity impeded their translocation by wave and other currents. This stability may promote egg incubation and subsequent initial exposure of larval hatchlings to environmental conditions most favorable to survival. Multiple linear regression of egg mass density against day number, substrate conditions, depth, water temperature, and photoperiod explained 60% of the variability in density; substrate alone accounted for 20-30%. Larval perch dispersed from spawning areas within a few hours of hatching. No significant mathematical relationship was established between abundance of larvae and environmental factors, but wave and other currents were suspected to influence their early distribution. Larvae from nearby river spawnings appeared in the lake 2-4 wk prior to lake-spawned larvae and contributed to an unmeasured but potentially significant segment of total coastal zone production of perch.

83-000218 Ekau, W. BIOLOGICAL INVESTIGATIONS ON *NOTOTHENIA RAMSAYI* REGAN 1913 (PISCES, NOTOTHENIOIDEI, NOTOTHENIIDAE). *Arch. Fischereiwiss.* 33(1-2):43-68. Nov. 1982. SFA 28(1)

[Inst. Küsten- Binnenfisch. Bundesforsch. Fisch., Hamburg, West Germany]

83-000219 Gleason, E. V. A REVIEW OF THE LIFE HISTORIES OF STRIPED BASS (*MORONE SAXATILIS*) AND WHITE BASS (*M. CHRYSOPS*) HYBRIDS AND AN EVALUATION OF THEIR SUITABILITY FOR STOCKING. *Calif. Dep. Fish Game Inland Fish. Admin. Rep.* No. 82-9. 19p. Nov. 1982. SFA 28(1)

[Calif. Dep. Fish Game, Inland Fish. Br., Sacramento, CA] Published information on the life histories of striped bass (*M. saxatilis*) x white bass (*M. chrysops*) hybrids is reviewed and synopsized. The white bass male x striped bass female hybrid, or original hybrid, is the fish most often stocked. Original hybrids are hardier than striped bass both in the hatchery

LIFE HISTORY-GENERAL WORKS (CONTINUED)

83-000219 CONTINUED and in the wild. They have a high survival rate and fast growth rates. They provide a pelagic fishery in February or March. Adult hybrids prefer a diet of clupeids. In the absence of clupeids they may feed on young game fish, but the rate of growth may be reduced. Competition with black bass fisheries and the effects of hybrid introductions on salmonid fisheries have not been measured. Hybrids are fertile and produce viable young but massive reproduction in the wild has not yet been documented. Downstream migration from reservoirs and illegal transplants by sport anglers must be considered in management plans. Hybrids my be difficult for most anglers to differentiate from parent stocks especially when fish are 35 cm (14 in.) or smaller. Until a better understanding of the complete life history requirements is obtained, great care and consideration should be accorded any proposed introduction of hybrids into California waters.

83-000220 Horncastle, G. S. LIFE HISTORY OF STEELHEAD TROUT FROM THE SOMASS RIVER ON VANCOUVER ISLAND. *B.C. Fish. Tech. Circ.* No. 51. 19p. 1981. SFA 28(1)

83-000221 Lammens, E. H. R. R. GROWTH, CONDITION AND GONAD DEVELOPMENT OF BREAM (*ABRAMIS BRAMA* L.) IN RELATION TO ITS FEEDING CONDITIONS IN TJEUKEMEER. *Hydrobiologia* 95:311-320. 29 Sept. 1982. SFA 28(1)

[Limnol. Inst., Tjeukemeer Lab., De Akkers 47, 8536 VD Oosterzee, The Netherlands] The bream (*Abramis brama* L.) population of Tjeukemeer was studied for three successive years. The growth, condition, gonad development, diet and feeding conditions of the fish are described. Food competition for two years with the then abundant young planktivorous smelt (*Osmerus eperlanus*) and perch (*Perca fluviatilis*) resulted in a decreased growth rate, condition and gonad development of the larger bream. The biomass of chironomids was too small in relation to that of the zooplankton to be important for the bream population, although they were eaten more efficiently.

83-000222 Matthews, W. J.; J. R. Bek and E. Surat. COMPARATIVE ECOLOGY OF THE DARTERS *ETHEOSTOMA PODOSTEMONE, E. FLABELLARE* AND *PERCINA ROANOKA* IN THE UPPER ROANOKE RIVER DRAINAGE, VIRGINIA. *Copeia* 1982(4):805-814. 21 Dec. 1982. SFA 28(1)

[Univ. Okla. Biol. Stn., Kingston 73439] *Etheostoma flabellare, Etheostoma podostemone* and *Percina roanoka*, which coexist in mainstreams of the upper Roanoke River drainage, Virginia, exhibit partial ecological segregation in sympatry. *E. flabellare* and *P. roanoka* are trophic generalists relative to *E. podostemone*, which specializes on chironomid prey. Differences among the species in diet breadth are consistent with differences in their morphology, with *E. flabellare* having the greatest width of gape and widest diversity of prey taxa and size. *E. flabellare* and *P. roanoka* differ somewhat in microhabitat, with *P. roanoka* occupying the swiftest portions of the streams. Despite partial segregation of the species across food and microhabitat niche axes, all three overlapped strongly in their overall use of resources. Of the three species, only *E. flabellare* is common in small tributaries of the drainage, where food and microhabitat availability seem likely to limit fish diversity.

83-000223 Mel'kikov, Y. S. DISTRIBUTION AND SOME BIOLOGICAL PROPERTIES OF THREE FLATFISH SPECIES (FAM. PSETTODIDAE AND BOTHIDAE) NEAR THE WESTERN COAST OF THE INDIAN PENINSULA. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 21(6):154-157. 1981. SFA 28(1)

[AzCherNIRO, Kerch, USSR]

LIFE HISTORY-GENERAL WORKS (CONTINUED)

83-000224 Payne, A. I. and R. I. Collinson. A COMPARISON OF THE BIOLOGICAL CHARACTERISTICS OF *SAROTHERODON NILOTICUS* (L.) WITH THOSE OF *S. AUREUS* (STEINDACHNER) AND OTHER TILAPIA OF THE DELTA AND LOWER NILE. *Aquaculture* 30(1-4):335-351. Jan. 1983. SFA 28(1)
[Biol. Dep., Coventry (Lanchester) Polytech., Coventry, England]

83-000225 Persons, W. R. and R. V. Bulkley. FEEDING ACTIVITY AND SPAWNING TIME OF STRIPED BASS IN THE COLORADO RIVER INLET, LAKE POWELL, UTAH. *N. Am. J. Fish. Manage.* 2(4):403-408. 1982. SFA 28(1)
[Utah Coop. Fish. Res. Unit, Utah State Univ., UMC-52, Logan 84322]

83-000226 Stein, D. L. and W. G. Pearcy. ASPECTS OF REPRODUCTION, EARLY LIFE HISTORY, AND BIOLOGY OF MACROURID FISHES OFF OREGON, U.S.A. *Deep-Sea Res. A Oceanogr. Res. Pap.* 29(11):1313-1329. 1982. SFA 28(1)
[Sch. Oceanogr., Oreg. State Univ., Corvallis 97331]

83-000227 Stevens, E. G. and H. G. Moser. OBSERVATIONS ON THE EARLY LIFE HISTORY OF THE MUSSEL BLENNY, *HYPSOBLENNIUS JENKINSI*, AND THE BAY BLENNY, *HYPSOBLENNIUS GENTILIS*, FROM SPECIMENS REARED IN THE LABORATORY. *Calif. Coop. Oceanic Fish. Invest.* 23:269-275. Oct. 1982. SFA 28(1)
[NMFS, Southwest Fish. Cent., La Jolla, CA 92038]

83-000228 Stott, F. C. NOTES ON THE BIOLOGY OF THE PATAGONIAN HAKE, *MERLUCCIUS HUBBSI* (MARINI), THE SOUTHERN BLUE WHITING, *MICROMESISTIUS AUSTRALIS* (NORMAN) AND OTHERS IN THE FALKLAND ISLANDS SHELF AREA. *J. Fish Biol.* 21(6):705-714. Dec. 1982. SFA 28(1)
[Back of Beyond, Winter Hill, Cookham Dean, Berkshire SL6 9TW, U.K.] From the examination of samples of fish caught in two commercial surveys on trawling grounds around the Falkland Islands, it is noted that Patagonian hake, *Merluccius hubbsi*, southern blue whiting, *Micromesistius australis*, and others occurred in fishable quantities especially to the east of Beauchêne Islands where fishes were larger and more numerous. However 47% of the total catch consisted of southern blue whiting which was 100% infested by a myxosporidian parasite in its musculature rendering it unsuitable for human consumption.

83-000229 Warburton, K. SANDEELS--THE ELUSIVE SPECIES. *Scott. Fish. Bull.* 47:22-27. 1982. SFA 28(1)
[Mar. Lab., P.O. Box 101, Victoria Rd., Torry, Aberdeen AB9 8DB, Scotland]

POPULATION STUDIES, PRODUCTION, RECRUITMENT, ETC.

83-000230 Conover, D. O. and M. R. Ross. PATTERNS IN SEASONAL ABUNDANCE, GROWTH AND BIOMASS OF THE ATLANTIC SILVERSIDE, *MENIDIA MENIDIA*, IN A NEW ENGLAND ESTUARY. *Estuaries* 5(4):275-286. Dec. 1982. SFA 28(1)
[Mar. Sci. Res. Cent., State Univ. N.Y., Stony Brook 11794] Patterns in seasonal abundance (no. per m^2 surface area), growth and biomass (g per m^2 surface area) of an annual fish, the Atlantic silverside, *Menidia menidia* (L.) were investigated in a marsh and more seaward bay region of Essex Bay, Massachusetts from August 1976 to May 1978 using a quantitative beach seining technique. Silverside abundance varied greatly by season and year class during the study period. Abundance was high in 1976 but winter mortality (99%) left an adult density of only .01 per m^2 surface area in the marsh during spring 1977. Resultant 1977 year class density in the marsh

POPULATION STUDIES, PRODUCTION, RECRUITMENT, ETC. (CONTINUED)

83-000230 CONTINUED was 1.88 per m^2 by late fall 1977 but winter mortality again produced an adult density of .01 per m^2 in spring 1978. Abundance was generally higher in the marsh than in the bay region especially during spring and late fall when catches in the bay were negligible. Based on catch rate comparisons, the summer and fall juvenile abundance of the 1976 year class was much higher than the juvenile abundance of the 1977 year class. Coincidentally, mean lengths and condition of the abundant 1976 year class in the late fall were significanlty lower than those of the 1977 year class, suggesting density dependent population regulation. In both years, juveniles grew rapidly and reached full adult size by November when an offshore movement to deeper waters outside Essex Bay occurred. Biomass peaked in the marsh region in late fall 1977 at 7.8 g per m^2 wet weight. Winter mortality was size selective, favoring larger individuals. The annual life history design of *M. menidia* including an offshore winter movement and high winter mortality suggests that silversides represent an important pathway of energy flow from marsh to offshore trophic systems.

83-000231 Fernando, C. H. and J. Holčík. THE NATURE OF FISH COMMUNITIES: A FACTOR INFLUENCING THE FISHERY POTENTIAL AND YIELDS OF TROPICAL LAKES AND RESERVOIRS. *Hydrobiologia* 97(2):127-140. 26 Nov. 1982. SFA 28(1)

[Dep. Biol., Univ. Waterloo, Canada] The discrepancy between high primary production and poor fish yields in some tropical reservoirs, especially South East Asia, is apparently due to the fact that not all available trophic levels are utilized. Data analysis has shown that this is due to the riverline origin of fish communities which are not well adapted to lacustrine habitats in such lakes and reservoirs. These fishes are able to inhabitat only a relatively narrow belt of the shallow inshore area. It has been shown that fish are rare in the deep water and pelagial area of geologially young lakes and reservoirs. Although most riverine fish are also able to inhabit the lacustrine habitat, only a few are preadapted to take advantage of deep or open water environments. In the tropics, Cichlidae and freshwater Clupeidae thrive in lakes and reservoirs. It is apparent that within these families suitable species can be chosen as potential candidates for introduction into young lakes and reservoirs. However, any fish introductions must be scientifically evaluated for desirability. Data from other lakes in the world have indicated that the present theory can be expanded to other than tropical lakes.

83-000232 Gibson, R. J. and Y. Côté. PRODUCTION DE SAUMONNEAUX ET RECAPTURES DE SAUMONS ADULTES ÉTIQUETÉS À RIVIÈRE MATAMEC, CÔTE-NORD, GOLFE DU SAINT-LAURENT, QUÉBEC. [PRODUCTION OF SMOLT AND RECAPTURED OF TAGGED ADULT SALMON FROM THE MATAMEC RIVER, NORTH SHORE, GULF ST. LAWRENCE, QUEBEC.] *Nat. Can. (Que.)* 109(1):13-25. 1982. In French with English summ. SFA 28(1)

[Peches Oceans Can., B.P. 5667, St. John's, Terre-Neuve A1C 5X1, Canada]

83-000233 Henderson, B. A. THE POPULATION DYNAMICS OF LAKE TROUT (*SALVELINUS NAMAYCUSH*) IN LAKE MANITOU, IN RELATION TO THE PLANTING AND SPAWN-TAKING OPERATION. *Ont. Fish. Tech. Rep. Ser.* No. 5. iv + 14p. 1982. SFA 28(1)

[Lake Huron Fish. Res. Unit, R.R. #1 Tehkummah, Ontario P0P 2C0, Canada]

83-000234 Hewitt, R. P. and R. D. Methot, Jr. DISTRIBUTION AND MORTALITY OF NORTHERN ANCHOVY LARVAE IN 1978 AND 1979. *Calif. Coop. Oceanic Fish. Invest.* 23:226-245. Oct. 1982. SFA 28(1)

[NMFS, Southwest Fish. Cent., La Jolla, CA 92038]

POPULATION STUDIES, PRODUCTION, RECRUITMENT, ETC. (CONTINUED)

83-000235 Kashkin, N. I. BIOMASS OF MESOPELAGIC FISHES IN THE EASTERN SUBTROPICAL PART OF THE NORTH ATLANTIC OCEAN. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 22(2):33-40. 1982. SFA 28(1)

[IOAN, Moscow, USSR] The biomass of mesopelagic fishes at depths to 700 m exceeded 16 g/10^4 m^3 in the oliogotrophic central waters of the Northern Atlantic Ocean, and in richer waters of the southern part of the Canary Current, up to 32 g/10^4 m^3. The average biomass of mesopelagic fishes for the water column in the oliogotrophic waters varied from 5 to 10 g/10^4 m^3. Correction for the catching efficency of the different sections of trawl increased these values almost two-fold. Collections were made in four regions by the open model of the Issacs--Kidd trawl with different mesh sizes (27 samples).

83-000236 Lindstöm, T. and G. Andersson. POPULATION ECOLOGY OF SALMONID POPULATIONS ON THE VERGE OF EXTINCTION IN ACID ENVIRONMENTS. *Inst. Freshwater Res. Drottningholm Rep.* No. 59. 81-96. 1981. SFA 28(1)

[Inst. Freshwater Res., S-170 11 Drottningholm, Sweden] The process of acidification is evident also in the Swedish high mountains. In the Fulufjäll area pH-levels have reached the range of variation which is critical to salmonid fish, and as a consequence some populations of char and grayling have become extinct and subsequent restocking experiments have proved unsuccessful. pH-tolerances can be described by deliberately coarse limitations as follows: char tolerated the pH register 5.5-5.0 but disappeared when pH dropped below 5.0. Burbot is preliminarily placed in the same class. Grayling disappeared when the pH dropped from 5.5 to 5.0. Trout did not disappear when the pH dropped just below 5.0. The tolerance to lower pH has not been studied. Critical limits could be defined approximately from these observations, but there is rather a risky pH register than a risky pH-level and within such a register, pH or water qualities covarying with pH become increasingly important when pH decreases. Other factors influencing the reproduction and survival within this critical register are, e.g., intraspecies competition and a disease (char), fishing pressure (grayling), and competition from other species. Interspecies competition becomes particulary evident when establishing new populations. Certain characteristics of populations living on the verge of extinction are particularly interesting. Growth is fairly good and recruitment still functioning in brown trout populations living at a pH just below 5, but the FULTON coefficient and the flesh colour have deteriorated. Intermittent reproduction in a char population living in the pH range 5.5-5.0 is rendered evident by liming in certain years.

83-000237 Lucchetti, G. L. and G. B. Pardue. THE PRODUCTION ECOLOGY OF BROOK TROUT (*SALVELINUS FONTINALIS*) IN SOUTHWEST VIRGINIA. *Va. J. Sci.* 33(3):81. 1982. Abstract only. SFA 28(1)

[Dep. Fish. Wildl. Sci., VPI&SU, Blacksburg, VA 24061] Brook trout (*Salvelinus fontinalis*) populations in four second order streams varying in water hardness (4-8/mg/ℓ), with two 200 m sections per stream, were sampled quarterly between May and December 1981. Production (P) was highest (4.15 g/m^2 yr) in a hardwater (18 mg/ℓ) section of Ewings Run, Craig Co.; however, no trend between hardness and P was apparent. P was lowest (0.31 g/m^2 yr) in a section of Lick Run, Bath Co., predominated (59%) by bedrock substrate. P was as variable within streams (SD ±.15 = ±1.41) as among streams (SD ± 1.13). Age 0 fish contributed from 40.3% - 66.2% to P in three of the study streams, followed by Age I (16.4% - 55.4%), Age II (6.0% - 31.8%), and Age III (-2% - 11.6%) fish. In one stream Age 0 fish contributed only 10.5 - 22.3% to P, while Age I and Age II fish contributed from 50.2% - 68.8% and from 20.7 - 27.6%, respectively. Maximum P was in the May-July period with 47.8% - 107.0% of total P occurring in that time. Minimum P was in the July-October period (-27.8% - 25.3%).

POPULATION STUDIES, PRODUCTION, RECRUITMENT, ETC. (CONTINUED)

83-000238 Riley, L. M. and R. F. Carline. EVALUATION OF SCALE SHAPE FOR THE IDENTIFICATION OF WALLEYE STOCKS FROM WESTERN LAKE ERIE. *Trans. Am. Fish. Soc.* 111(6):736-741. Nov. 1982. SFA 28(1)
[Ohio Coop. Fish. Res. Unit, 1735 Neil Ave., Columbus 43210]

83-000239 Shuntov, V. P. and V. P. Vasil'kov. LONG-TERM POPULATION FLUCTUATIONS OF NORTH PACIFIC SARDINES. II. EPOCHS OF ATMOSPHERIC CIRCULATION AND CYCLIC NATURE OF THE POPULATION DYNAMICS OF THE PACIFIC AND CALIFORNIAN SARDINES. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 22(2):10-23. 1982. SFA 28(1)
[TINRO, Vladivostok, USSR] Changes in sardine populations depending upon the alternation of the epochs of atmospheric circulation is examined. In the twentieth century all the major peaks in the Pacific and Californian sardine populations took place only in the epochs of zonal atmospheric circulation. It has been proposed that the cyclic nature of the dynamics and population strength of sardines is based on the fact that the epochs of zonal circulation are confined to the low and medium levels of solar activity during the century.

83-000240 Shuntov, V. P. and V. P. Vasil'kov. LONG TERM POPULATION FLUCTUATIONS OF NORTH PACIFIC SARDINES. I. POPULATION DYNAMICS OF THE EASTERN SARDINE, *SARDINOPS SAGAX MELANOSTICTA*, AND CALIFORNIA SARDINE, *SARDINOPS SAGAX CAERULEA*, IN THE TWENTIETH CENTURY. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 21(6):1-13. 1981. SFA 28(1)
[TINRO, Vladivostok, USSR] Increased abundance of Eastern and Californian sardines in the 1920s and 1930s are described and the present increased abundance of Eastern sardines analyzed. The major increase of Eastern sardines during 1920s and 1930s occurred near the southern coast of Kyushu Island. At present, the most intensive spawning takes place near the eastern coast of Honshu Island. All these spurts in sardine population in the 20th century took place during the periods of significant warming. Changes in the sardine population in the near future are predicted.

83-000241 Yefanov, V. N. and V. M. Chupakhin. THE DYNAMICS OF SOME POPULATION INDICES OF PINK SALMON, *ONCORHYNCHUS GORBUSCHA*, FROM ITURUP (KURIL ISLANDS). *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 22(1):42-50. 1982. SFA 28(1)
[Sakhalin Br., Pac. Res. Inst. Sea Fish. Oceanogr., USSR]

SPAWNING HABITS AND MOVEMENTS, FECUNDITY, ETC.

83-000242 Alekseyev, F. E. and E. I. Alekseyeva. SOME ASPECTS OF THE REPRODUCTIVE BIOLOGY OF OCEANIC AND NERITIC TUNA (SCOMBRIDAE) IN THE TROPICAL ATLANTIC. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 21(5):52-64. 1981. SFA 28(1)
[AtlantNIRO, Kaliningrad, USSR] In all the species of tuna studied, the length of the reproductive period of females is no more than 6 months. The maturation of individuals in each specific reproductive group occurs in a relatively synchronous manner, and the duration of large-scale spawning is comparable to the length of the reproductive period of individuals. The apparent year-round spawning of tuna in equatorial waters can be attributed to erroneous addition of the reproductive periods of groups of fish from the northern and southern hemispheres, having reproductive cycles 90° out of phase. Each of the species studied is represented in the eastern part of the tropical Atlantic by no less than two independently reproducing groups, one in the northern hemisphere and one in the southern. Differences in the

SPAWNING HABITS AND MOVEMENTS, FECUNDITY, ETC. (CONTINUED)

83-000242 CONTINUED nature of spawning between oceanic and neritic species are due to differences in the degree of discontinuity of vitellogenesis. The oceanic bigeye tuna, which has a spawning period of comparable length, spawns a significantly larger number of batches at smaller intervals. The specific reproductive biology of the tuna depends on conditions for reproduction in substantially different environments: the fixed presence and long-term existence at specific productive zones in the neritic area ("small" tuna), and the probable location and indeterminate "life span" of these zones in oceanic pelagic zones (the bigeye tuna).--Concl.

83-000243 Alekseyev, F. Y.; I. Y. Alekseyeva and I. Y. Kukuyev. SOME MORPHOLOGICAL FEATURES AND THE STATE OF THE OVARIES IN THE RARE DEEPSEA FISHES *OPISTHOPROCTUS SOLEATUS* AND *RHYNCHOHYALUS NATALENSIS*, OPISTHOPROCTIDAE (SALMONIFORMES) FROM THE SARGASSO SEA. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 22(1):141-147. 1982. SFA 28(1)
[AtlantNIRO, Kaliningrad, USSR]

83-000244 Alvarez-Lajonchere, L. THE FECUNDITY OF MULLET (PISCES, MUGILIDAE) FROM CUBAN WATERS. *J. Fish Biol.* 21(6):607-613. Dec. 1982. SFA 28(1)
[Cent. Invest. Mar., Univ. Habana, Miramar, Habana, Cuba]

83-000245 Blay, J., Jr. and K. N. Eyeson. OBSERVATIONS ON THE REPRODUCTIVE BIOLOGY OF THE SHAD, *ETHMALOSA FIMBRIATA* (BOWDICH), IN THE COASTAL WATERS OF CAPE COAST, GHANA. *J. Fish Biol.* 21(5):485-496. Nov. 1982. SFA 28(1)
[K.N. Eyeson: Dep. Zool., Univ. Cape Coast, Ghana]

83-000246 Brewer, G. D. and P. E. Smith. NORTHERN ANCHOVY AND PACIFIC SARDINE SPAWNING OFF SOUTHERN CALIFORNIA DURING 1978-80: PRELIMINARY OBSERVATIONS ON THE IMPORTANCE OF THE NEARSHORE COASTAL REGION. *Calif. Coop. Oceanic Fish. Invest.* 23:160-171. Oct. 1982. SFA 28(1)
[Inst. Mar. Coastal Stud., Univ. South. Calif., University Park, Los Angeles 90007]

83-000247 Carl, L. M. NATURAL REPRODUCTION OF COHO SALMON AND CHINOOK SALMON IN SOME MICHIGAN STREAMS. *N. Am. J. Fish. Manage.* 2(4):375-380. 1982. SFA 28(1)
[Dep. Energy Nat. Resour., 8th Floor South Tower, Petroleum Plaza, 9915-108th St., Edmonton, AB T5K 2C9, Canada]

83-000248 Dumont, P.; R. Pariseau and J. Archambault. FRAIE DU TOULADI (*SALVELINUS NAMAUYCUSH*) EN TRÈS FAIBLE PROFONDEUR. [SPAWNING OF LAKE TROUT (*SALVELINUS NAMAYCUSH*) IN VERY SHALLOW DEPTHS.] *Can. Field-Nat.* 96(3):353-354. July-Oct. 1982. In French with English summ. SFA 28(1)
[Minist. Loisir, 13 rue Buteau, Hull, PQ J8Z 1V4, Canada] We describe egg distribution in relation to depth on a Lake Trout spawning ground located at David Lake in southwestern Québec. Eggs were found in 12 to 95 cm of water in a thick rubble bottom. Maximum densities were observed in water less than 60 cm. Data seem to indicate that thickness of the substrate can be important in the choice of spawning ground.

83-000249 Efremenko, V. N.; A. N. Kotlyar and L. A. Lisovenko. SEX CYCLES, FECUNDITY, AND DISTRIBUTION OF "LIMBLESS" SOLES OF FAMILY BOTHIDAE FROM THE SOUTHWESTERN ATLANTIC. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)*

SPAWNING HABITS AND MOVEMENTS, FECUNDITY, ETC. (CONTINUED)

83-000249 CONTINUED 21(6):89-99. 1981. SFA 28(1)
[VNIRO, Moscow, USSR]

83-000250 Garrett, G. P. VARIATION IN THE REPRODUCTIVE TRAITS OF THE PECOS PUPFISH, *CYPRINODON PECOSENSIS*. *Am. Midl. Nat.* 108(2):355-363. Oct. 1982. SFA 28(1)
[Tex. Parks Wildl. Dep., Heart of the Hills Res. Stn., Jct. Star Rt. Box 62, Ingram 78025] The reproductive traits of two populations of *Cyprinodon pecosensis* were studied and both populations were found to vary several reproductive components. This was demonstrated in nature and in experimental manipulations by changes in each of the measured parameters. Both seem to have similar potential in ovary and clutch size. Egg size, however, appears to have a genetically fixed range that is different for each population.

83-000251 Gavrenkov, Y. I. REPRODUCTIVE ECOLOGY OF PACIFIC REDFIN, *TRIBOLODON BRANDTI*, AND LARGE-SCALED REDFIN, *TRIBOLODON HAKONENSIS*. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 22(1):37-41. 1982. SFA 28(1)
[Far East. Univ., Vladivostok, USSR]

83-000252 Gorbach, E. I. FECUNDITY OF AMUR PIKE, *ESOC REICHERTI*. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 22(1):63-68. 1982. SFA 28(1)
[AO TINRO, Khabarovsk, USSR] In various local populations of the Amur pike absolute fecundity is almost the same, amounting on average to 50,400 eggs with fluctuations between 7,300 and 236,500 eggs. With the increase in the size, weight, age, condition factor and rate of growth of the females it increases. Its correlation with the length, weight and age of the females is sufficiently accurately described by the equation $y = A \cdot x^C$. The mean relative fecundity of the Amur pike is 25 eggs per 1 g of body weight without viscera, the minimum 7 eggs and the maximum 57 eggs per g. Females 55-80 cm long have the highest and most stable relative fecundity. It differs little in different local populations.--Concl.

83-000253 Helvey, M. FIRST OBSERVATIONS OF COURTSHIP BEHAVIOR IN ROCKFISH, GENUS *SEBASTES*. *Copeia* 1982(4):763-770. 21 Dec. 1982. SFA 28(1)
[Vantuna Res. Group, Dep. Biol., Occidental Coll., 1600 Campus Rd., Los Angeles, CA 90041] The courtship behavior of the blue rockfish, *Sebastes mystinus*, is described from underwater observations off southern California. Courtship activity corresponded with male gonadal recrudescence, beginning in late summer-early fall, and extending until early winter. Courtship occurred just above the substratum at reefs deeper than 15 m. Males were the active participants during courtship while females were relatively inactive. Males performed a sequence of stereotyped movements to the motionless females that included a "front position," "lateral pass," "tail fan" and "turn". Females attracted varying size entourages of males, but only a few males actually courted the female. Females were frequently courted within short periods of time but never appeared aroused. Arguments are presented that courtship behavior in blue rockfish functions in persuasion leading to mate selection.

83-000254 Itzkowitz, M. and J. Nyby. FIELD OBSERVATIONS OF PARENTAL BEHAVIOR OF THE TEXAS CICHLID *CICHLASOMA CYANOGUTTATUM*. *Am. Midl. Nat.* 108(2):364-368. Oct. 1982. SFA 28(1)
[Biol. Dep., Lehigh Univ., Bethlehem, PA 18015] Observations were made in the San Antonio and San Marcos rivers of central Texas on mated pairs of Texas Cichlids (*Cichlasoma cyanoguttatum*) both before and following fertilization. Monogamy was the only mating system observed with pair formation occurring prior to territory establishment. Following fertilization the parental behaviors of both members of the mated pair were observed

SPAWNING HABITS AND MOVEMENTS, FECUNDITY, ETC. (CONTINUED)

83-000254 CONTINUED through all three stages of offspring development (eggs, wrigglers and fry). During the egg stage the male and female alternated in the performance of major parental responsibilities. Although male and female parental behaviors were qualitatively similar, quantitative sex differences were evident. The male spent more time patrolling the territory and the female spent more time in close proximity to and attending to the offspring. These quantitative differences, as well as the alternation of behaviors, diminished in the wriggler stage and largely disappeared by the fry stage. Somewhat paradoxically, at all stages of offspring development the female chased conspecific intruders more often and with faster chases.

83-000255 Loiselle, P. V. MALE SPAWNING-PARTNER PREFERENCE IN AN ARENA-BREEDING TELEOST *CYPRINODON MACULARIUS CALIFORNIENSIS* GIRARD (ATHERINOMORPHA: CYPRINODONTIDAE). *Am. Nat.* 120(6):721-732. Dec. 1982. SFA 28(1)
[Lab. Limnol., Univ. Wis., Madison 53706]

83-000256 Müller, K. and E. Berg. SPRING MIGRATION OF SOME ANADROMOUS FRESHWATER FISH SPECIES IN THE NORTHERN BOTHNIAN SEA. *Hydrobiologia* 96(2):161-168. 15 Oct. 1982. SFA 28(1)
[Univ. Umeå, Sweden]

83-000257 McLean, R. B.; T. P. Singley; D. M. Lodge and R. A. Wallace. SYNCHRONOUS SPAWNING OF THE THREADFIN SHAD. *Copeia* 1982(4):952-955. 21 Dec. 1982. SFA 28(1)
[Energy Div., Oak Ridge Natl. Lab., Oak Ridge, TN 37830]

83-000258 Moyer, J. T. and Y. Yogo. THE LEK-LIKE MATING SYSTEM OF *HALICHOERES MELANOCHIR* (PISCES: LABRIDAE) AT MIYAKE-JIMA, JAPAN. *J. Comp. Ethol.* 60(3):209-226. Nov. 1982. SFA 28(1)
[Tatsuo Tanaka Mem. Biol. Stn., Ako, Miyake-jima, Izu Islands, Japan 100-12] Reproductive behavior and social organization of the labrid fish *Halichoeres melanochir* were studied at Miyake-jima, Izu Islands, Japan. ♂♂ set up contiguous territories from early to mid-afternoon daily during the breeding season, with ♂♂ at the center of the spawning experiencing significantly higher spawning success than those at the site periphery. Unlike other labrids with lek-like mating systems previously reported, *H. melanochir* is sexually monochromatic and shows only minimal sexual size-dimorphism. The spawning behavior and mating system are described and compared with current theories on labrid reproductive strategies.

83-000259 Mundy, P. R. COMPUTATION OF MIGRATORY TIMING STATISTICS FOR ADULT CHINOOK SALMON IN THE YUKON RIVER, ALASKA, AND THEIR RELEVANCE TO FISHERIES MANAGEMENT. *N. Am. J. Fish. Manage.* 2(4):359-370. 1982. SFA 28(1)
[Dep. Oceanogr., Sch. Sci. Health Prof., Old Dominion Univ., Norfolk, VA 23508]

83-000260 Robertson, D. R.; R. Reinboth and R. W. Bruce. GONOCHORISM, PROTOGYNOUS SEX-CHANGE AND SPAWNING IN THREE SPARISOMATININE PARROTFISHES FROM THE WESTERN INDIAN OCEAN. *Bull. Mar. Sci.* 32(4):868-879. Oct. 1982. SFA 28(1)
[Smithsonian Trop. Res. Inst., Apt. 2072, Balboa, Panama]

SPAWNING HABITS AND MOVEMENTS, FECUNDITY, ETC. (CONTINUED)

83-000261 Roff, D. A. REPRODUCTIVE STRATEGIES IN FLATFISH: A FIRST SYNTHESIS. *Can. J. Fish. Aquatic Sci.* 39(12):1686-1698. Dec. 1982. In English with French summ. SFA 28(1)
[Biol. Dep., McGill Univ., 1205 Ave. Dr. Penfield, Montreal, PQ H3A 1B1, Canada]

83-000262 Serns, S. L. WALLEYE FECUNDITY, POTENTIAL EGG DEPOSITION, AND SURVIVAL FROM EGG TO FALL YOUNG-OF-YEAR IN ESCANABA LAKE, WISCONSIN, 1979-1981. *N. Am. J. Fish. Manage.* 2(4):388-394. 1982. SFA 28(1)
[Wis. Dep. Nat. Resour., Box 440, Woodruff 54568]

83-000263 Sil'yanova, Z. S. RELATIVE FECUNDITY OF SOME SPECIES OF FISH OF THE FAMILY NOTOTHENIIDAE. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 22(1):151-154. 1982. SFA 28(1)
[VNIRO, Moscow, USSR]

83-000264 Volodin, V. M. FECUNDITY OF BREAM, *ABRAMIS BRAMA*, IN RYBINSK RESERVOIR. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 22(2):61-68. 1982. SFA 28(1)
[Inst. Biol. Inland Waters, Acad. Sci. USSR, Borok, Yaroslavl Dist., USSR]

83-000265 Winemiller, K. O. and D. H. Taylor. SMALLMOUTH BASS NESTING BEHAVIOR AND NEST SITE SELECTION IN A SMALL OHIO STREAM. *Ohio J. Sci.* 82(5):266-273. Dec. 1982. SFA 28(1)
[Dep. Zool., Univ. Tex., Austin 78712] Individual smallmouth bass, *Micropterus dolomieui*, were observed in a 500 m stretch of Indian Creek, Ohio, during May and June of 1980 and 1981. Nineteen nests were found in 1980; 8 of which received eggs. Spawned nests were more often guarded by larger males than unspawned nests and were located at sites which were protected from increases in water current velocity during moderate flood stages. Unspawned nests were abandoned within 2 days of the peak spawning activity at Indian Creek, and prior to damage by moderate flooding on 11 and 12 May. Extensive flooding on 17, 18 and 19 May terminated smallmouth bass nesting behavior and appeared to destroy all nests under study in 1980. In 1981, 49 nests were found; 7 of which received eggs. Many of the unspawned nests appeared to be repeated constructions by males that were unsuccessful in attracting mates. Spawned nests were significantly more uniform than abandoned nests in diameter and water depth in 1981. Two aggregations of black fry were located in the study area on 13 and 17 June, 1981. The fry were displaced approximately 250 m downstream from their original nest sites by moderate flooding on 12 June. Smallmouth bass nest site selection and breeding success are discussed in relation to the problem of reproducing in a variable environment.

MOVEMENTS, SEASONAL AND DEPTH DISTRIBUTION, ETC.

83-000266 Bakun, A. and R. H. Parrish. TURBULENCE, TRANSPORT, AND PELAGIC FISH IN THE CALIFORNIA AND PERU CURRENT SYSTEMS. *Calif. Coop. Oceanic Fish. Invest.* 23:99-112. Oct. 1982. SFA 28(1)
[NMFS, P.O. Box 831, Monterey, CA 93942]

83-000267 Brown, J. A. and P. W. Colgan. THE INSHORE VERTICAL DISTRIBUTION OF YOUNG-OF-YEAR *LEPOMIS* IN LAKE OPINICON, ONTARIO. *Copeia* 1982(4):958-960. 21 Dec. 1982. SFA 28(1)
[Dep. Biol., Queen's Univ., Kingston, ON K7L 3N6, Canada]

MOVEMENTS, SEASONAL AND DEPTH DISTRIBUTION, ETC. (CONTINUED)

83-000268 Gabriel, W. L. STRUCTURE AND DYNAMICS OF NORTHEASTERN PACIFIC DEMERSAL FISH ASSEMBLAGES. *Ph.D. dissertation, Oreg. State Univ.* 310p. 1983. From Diss. Abstr. Int. B Sci. Eng. 43(7):2081. Jan. 1983. SFA 28(1)

83-000269 Josephson, D. and G. Pardue. SEASONAL MOVEMENTS OF BROWN TROUT (*SALMO TRUTTA*) IN A VIRGINIA STREAM. *Va. J. Sci.* 33(3):79. 1982. Abstract only. SFA 28(1)
[Dep. Fish. Wildl. Sci., VPI&SU, Blacksburg, VA 24061]

83-000270 Kotrschal, K. and W. W. Reynolds. BEHAVIORAL ECOLOGY OF NORTHERN ADRIATIC REEF FISHES IN RELATION TO SEASONAL TEMPERATURE REGIMES. *Contrib. Mar. Sci.* 25:99-106. Aug. 1982. SFA 28(1)
[Zool. Inst., Univ. Salzburg, A-5020 Salzburg, Austria] Observations by scuba diving of shallow sublittoral reef fishes in the northern Adriatic during the winter indicate that these fishes remain in their reef habitats throughout the winter. Many of them, particularly those of tropical affinities, become inactive and remain under cover at low (7-10°C) winter temperatures. Littoral tidepools are abandoned at the lowest (near-freezing) temperatures, but there is no migration of reef fishes to deeper and slightly warmer (12.5°C) sublittoral waters, where reef habitats are unavailable in the northern Adriatic. Cold-tolerant predators such as *Scorpaena ustulata* feed opportunistically on cold-numbed prey species. Different thermal tolerances and optima, reflected by spawning and other activity maxima at different times of the year, suggest that seasonal shifts in interspecific interactions among the reef fish species are influenced largely by temperature.

83-000271 Müller, K. JUNGFISCHWANDERUNGEN ZUR BOTTENSEE. [SEAWARD MIGRATION OF JUVENILE FISH SPECIES TO THE BOTHNIAN SEA.] *Arch. Hydrobiol.* 95:271-282. 1982. In German with English summ. SFA 28(1)
[Univ. Umeå, Dep. Ecol. Zool., S-901 87 Umeå, Sweden]

83-000272 Osburn, H. R.; G. C. Matlock and A. W. Green. RED DRUM (*SCIAENOPS OCELLATUS*) MOVEMENT IN TEXAS BAYS. *Contrib. Mar. Sci.* 25:85-97. Aug. 1982. SFA 28(1)
[Tex. Parks Wildl. Dep., P.O. Box 1707, Rockport 78382] Red drum movement in Texas bays was studied by means of fish tagged with internal abdominal anchor tags and subsequently released. Intrabay movement was minimal with the majority (>71%) of returned tagged red drum moving <10km. Few fish were returned from the Gulf or from outside the bay in which they were tagged. Movement patterns of red drum, however, differed significantly among some bay systems. There was no detectable relation between minimum distance moved by red drum and seasons or size of fish. The previously reported mass migration of red drum in winter was not detected in this study. Texas bay systems can be considered closed systems for fish ~305-625mm TL when managing red drum stocks. Due to the restricted movement patterns, local populations of red drum could be vulnerable to intense fishing pressure.

83-000273 Otis, K. J. and J. J. Weber. MOVEMENT OF CARP IN THE LAKE WINNEBAGO SYSTEM DETERMINED BY RADIO TELEMETRY. *Wis. Dep. Nat. Resour. Tech. Bull.* No. 134. 16p. 1982. SFA 28(1)
[Wis. Dep. Nat. Resour., Bur. Res., Oshkosh] Carp (*Cyprinus carpio* Linnaeus) movement, as determined both by conventional tagging (582 carp) and by radio telemetry (19 carp) with boat, aircraft, and from the ground was found to be influenced primarily by spawning, habitat, and seasonal factors. Carp home ranges during winter months were in the deepest areas of the lakes and were approximately one-third the size of summer home ranges. The least

MOVEMENTS, SEASONAL AND DEPTH DISTRIBUTION, ETC. (CONTINUED)

83-000273 CONTINUED carp movement was noted in January and February. Carp were sensitive to disturbances on the water or ice, and radio-tagged carp appeared to display conditioned behavior to avoid close contacts with the tracking boat, and recapture attempts with an electroshocking boat. Radio-tagged carp were observed to return to their spawning grounds following intentional displacement. Year-to-year homing tendencies or home range behavior, however, was not observed to be characteristic of carp. Tagged carp were observed to relocate their ranges from year to year within a lake and sometimes from lake to lake. Radio tracking offers promise for increasing the effectiveness of carp control activities of other waters.

83-000274 Peck, J. W. EXTENDED RESIDENCE OF YOUNG-OF-THE-YEAR LAKE TROUT IN SHALLOW WATER. *Trans. Am. Fish. Soc.* 111(6):775-778. Nov. 1982. SFA 28(1)
[Mich. Dep. Nat. Resour., Marquette Fish. Res. Stn., 484 Cherry Creek Rd., Marquette 49855]

83-000275 Rankine, P. A. and M. Walsh. TRACING THE MIGRATIONS OF MINCH MACKEREL. *Scott. Fish. Bull.* 47:8-13. 1982. SFA 28(1)
[Mar. Lab., P.O. Box 101, Victoria Rd., Torry, Aberdeen AB9 8DB, Scotland]

FOODS/FEEDING

83-000276 Akintunde, E. A. FEEDING RHYTHM IN RELATION TO CHANGING PATTERNS OF pH IN THE GUT OF *SAROTHERODON GALILAEUS* (ARTEDI) OF LAKE KAINJI, NIGERIA. *Hydrobiologia* 97(2):179-184. 26 Nov. 1982. SFA 28(1)
[Dep. Zool., Univ. Ife, Ile-Ife, Nigeria] Different sizes of *Sarotherodon galilaeus* of Lake Kainji were caught at different hours to determine their feeding time and feeding intensity in relation to pH. It was found that the fish fed with different intensity during the day, and there was no feeding during the night. The pH values were found to vary with the amount of food in the gut.

83-000277 Bachman, R. A. FORAGING BEHAVIOR OF FREE-RANGING WILD BROWN TROUT (*SALMO TRUTTA*) IN A STREAM. *Ph.D. dissertation, Pa. State Univ.* 174p. 1982. From Diss. Abstr. Int. B Sci. Eng. 43(7):2098. Jan. 1983. SFA 28(1)
Free-ranging wild brown trout (*Salmo trutta*) in a fertile, high-conductivity stream were observed from camouflaged observation towers for three consecutive years in order to quantify the diurnal feeding and social behavior of undisturbed adult trout. The foraging behavior observed was characterized in general as one of net energy maximization effectuated principally by cost minimization. Individuals ranging in age from young-of-the-year to eight years old spent 86% of foraging time in a sit-and-wait search state, used discrete, energy-saving, foraging sites year after year and fed mainly off drift, taking less than 15% of their food items directly off the bottom. Feeding rates decreased with age, were highest in spring and fall, and showed little effect of time of day except for short peaks at dusk in May and June. The home range of most individuals was established when the trout were young-of-the-year or yearlings and changed little thereafter. The mean size of the home range of all individuals observed was 15.6 m^2 and decreased slightly during the first four years of growth. No individual had exclusive use of any home range and no clearly defined territory could be described for any trout. Rather, the social structure evidenced is best described as a cost-minimizing, size dependent, linear dominance hierarchy consisting of individuals having overlapping home ranges. Mosaics of territories described for juvenile salmonids by other

FOODS/FEEDING (CONTINUED)

83-000277 CONTINUED investigators were not observed for brown trout of any age. There was no apparent correlation between dominance and site selection with respect to distance to cover or feeding rate. Use of overhead cover ranged from less than 17% of daylight hours for trout of age-group 2 to less than 43% for age-group 5. Growth was asymptotic at 40 cm. A rectangular hyperbola described well the overall growth curve of the population with half of the asymptotic length being attained at an age of 23 months. Hatchery brown trout, introduced for experimental purposes, fed less, moved more, and used cost-minimizing features of the substrate less than wild trout. High energy cost is postulated as a major cause of mortality among hatchery-reared trout stocked in streams. An energy-balance growth model is presented which shows how physiological and environmental constraints imposed upon drift-feeding salmonids shape the behavior of the fish.

83-000278 Borodulina, O. D. FOOD COMPOSITION OF YELLOWFIN TUNA *THUNNUS ALBACARES* (SCOMBRIDAE). *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 21(6):38-46. 1981. SFA 28(1)

[Inst. Oceanol., Acad. Sci. USSR, Moscow, USSR] The food of yellowfin tuna *Thunnus albadares*, from the Atlantic and Pacific Oceans was studied. It was found that squids and fishes constitute their major food. Fishes from the families Paralepididae, Alepisauridae, Bramidae, and Chiasmodontidae are of major food value. The predominant food of yellowfin tuna by weight live in the upper mesopelagic zone and are characterized by constant dissociation of a large part of population at the upper boundary of the major thermawedge.

83-000279 Buynak, G. L.; H. W. Mohr, Jr. and A. J. Gurzynski. SOME OBSERVATIONS OF FOOD SELECTIVITY BY SMALL WALLEYE (*STIZOSTEDION VITREUM*) UNDER AQUARIUM CONDITIONS. *Proc. Pa. Acad. Sci.* 56(1):26-28. 1982. SFA 28(1)

[Ichthyological Assoc., Inc., R.D. 1, Berwick, PA 18603] Under aquarium conditions, the sublegal walleye (*Stizostedion vitreum*) tested consumed larger sunfish than minnows in terms of body depth. These walleye, however, were able to consume larger minnows with respect to total length and weight. In addition, these walleye preferred the smallest of the forage available to them; they also preferred minnows over sunfish. The preference for minnows seemed to increase as the walleye became larger. These data, along with data collected from food habit studies, indicate that the large numbers of sublegal walleye present in the Susquehanna River at the present time may be competing for a similar forage.

83-000280 Carle, K. J. and P. A. Hastings. SELECTION OF MEIOFAUNAL PREY BY THE DARTER GOBY, *GOBIONELLUS BOLEOSOMA* (GOBIIDAE). *Estuaries* 5(4):316-318. Dec. 1982. SFA 28(1)

[Mus. Comp. Zool., Harvard Univ., Cambridge, MA 02138] The darter goby, *Gobionellus boleosoma*, sieves meiofaunal organisms from ingested sediment bites. Gut contents of darter gobies were compared with available food items as determined from core analysis. Copepods (the most numerous item in guts), and ostracods were significantly selected for by the gobies. Nematodes occurred in the same relative numbers in guts as in cores. Foraminifera (the most numerous item in cores) were significantly selected against.

83-000281 Chekunova, V. I. and A. G. Naumov. ENERGY METABOLISM AND FOOD REQUIREMENTS OF THE MARBLED NOTOTHENIA, *NOTOTHENIA ROSSI MARMORATA* (NOTOTHENIIDAE). *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 22(2):112-121. 1982. SFA 28(1)

On the basis of experimental data, the equation of dependence of metabolism upon body weight is derived as: $R = 0.151 \cdot W^{0.831}$. The

FOODS/FEEDING (CONTINUED)

83-000281 CONTINUED average daily ration for different age groups of marbled notothenia, *Notothenia rossi marmorata*, in different seasons of the year was calculated. The daily ration for young fishes is 2.8-3.6% of the body weight during the summer-autumn period and 7.4-8.9% for adults. The ration for young fishes in winter-spring period is 1.8-2.4%, and for sexually mature fish 1.1-1.3% of body weight. The krill, *E. superba* constitutes 43% of the total annual ration by weight.

83-000282 Clarke, T. A. FEEDING HABITS OF STOMIATOID FISHES FROM HAWAIIAN WATERS. *NOAA Fish. Bull.* 80(2):287-304. Apr. 1982. SFA 28(1)
[Dep. Oceanogr., P.O. Box 1346, Kaneohe, HI 96744]

83-000283 de Nie, H. W. A NOTE ON THE SIGNIFICANCE OF LARGER BIVALVE MOLLUSCS (*ANODONTA* SPP. AND *DREISSENA* SP.) IN THE FOOD OF THE EEL (*ANGUILLA ANGUILLA*) IN TJEUKEMEER. *Hydrobiologia* 95:307-310. 29 Sept. 1982. SFA 28(1)
[Limnol. Inst., Tjeukemeer Lab., De Akkers 47, 8536 VD Oosterzee, The Netherlands] The stomach contents of 517 eels were analyzed during 1979. In that particular year the diet consisted predominantly of chironomids, but large bivalve molluscs were of secondary importance. The meaning of this observation is discussed in relation to food conditions and the food preference of the eel.

83-000284 Enderlein, O. INTERSPECIFIC FOOD COMPETITION BETWEEN THE THREE PELAGIC ZOOPLANKTONFEEDERS, CISCO (*COREGONUS ALBULA* (L.)), SMELT (*OSMERUS EPERLANUS* (L.)) AND HERRING (*CLUPEA HARENGUS* L.) IN THE NORRBOTTEN PART OF THE BOTHNIAN BAY. *Inst. Freshwater Res. Drottningholm Rep.* No. 59. 15-20. 1981. SFA 28(1)
[Inst. Freshwater Res., S-170 11 Drottningholm, Sweden] The experimental gillnetting of 1975 and 1976 yielded 12,400 fishes of which 28 per cent were cisco, 2 per cent smelt and 39 per cent herring. Cisco, smelt (freshwater fishes) and herring (a saltwater fish) are very rarely found together. The zooplankton species *Bosmina coregoni*, *Eurytemora* spp. and *Limnocalanus grimaldii* were found to be important food items for all three fish species but the smallest of the zooplankton (*B. coregoni*) were most abundant in cisco stomachs and least abundant in smelt stomachs. Large food items like mysids were found in smelt and sometimes in herring but never cisco. Usually, the fish species which is best able to feed on small items, in this case the cisco, becomes dominant but it is not so in this ecosystem. Abiotic factors such as the brackish water probably interact, with the result that two species, herring and cisco, are dominant.

83-000285 Enderlein, O. WHEN, WHERE, WHAT AND HOW MUCH DOES THE ADULT CISCO, *COREGONUS ALBULA* (L.) EAT IN THE BOTHNIAN BAY DURING THE ICE-FREE SEASON. *Inst. Freshwater Res. Drottningholm Rep.* No. 59. 21-32. 1981. SFA 28(1)
[Inst. Freshwater Res., S-170 11 Drottningholm, Sweden] The cisco breakfast between 6 and 9 a.m. in midwater, on its way down to the bottom. Breakfast consists of *Limnocalanus grimaldii*. Lunch is not eaten except in October when the ciscoes have a brunch (breakfast-lunch) consisting of *Bosmina coregoni maritima*, *Eurytemora* spp and *Daphnia cristata*. Dinner is eaten on the way to and at the surface (the time varies with the season, but is usually between 3 and 9 p.m.) and consists mostly of *Bosmina* and *Eurytemora*. A supper of terrestrial insects trapped at the surface is sometimes eaten in the evenings when the weather is good. The amount consumed during 24 hours varies considerably, being about 1 per cent of the body weight in the beginning of June and mid October, 30 per cent at the end of July and about 10 per cent in the beginning of September. There is no direct correlation between the zooplankton species present and those which are consumed. My explanation for this is that the zooplankton are invisible to

FOODS/FEEDING (CONTINUED)

83-000285 CONTINUED the cisco for most of the time, but when visible zooplankton are abundant the fish prey heavily upon them. A rapid gastric evacuation rate enables them to take advantage of these occasions.

83-000286 Ermolin, V. P. SIGNIFICANCE OF INDIVIDUAL GROUPS OF FOOD ORGANISMS IN FISH PRODUCTION. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 21(5):93-98. 1981. SFA 28(1)

[GosNIORKh, USSR] Questions concerning methods of studying the significance of individual groups of food organisms for fish production are examined. It is proposed to estimate the importance of these groups in commercial fish catches as the total annual increase resulting from consumption of certain prey by the oldest fishes in the catches.

83-000287 Fairchild, G. W. POPULATION RESPONSES OF PLANT-ASSOCIATED INVERTEBRATES TO FORAGING BY LARGEMOUTH BASS FRY (*MICROPTERUS SALMOIDES*). *Hydrobiologia* 96(2):169-176. 15 Oct. 1982. SFA 28(1)

[Biol. Dep., Cent. Mich. Univ., Mt. Pleasant 48859] The effect of foraging by largemouth bass fry (*Micropterus salmoides*) upon invertebrates associated with aquatic macrophytes was determined using six $4m^2$ exclosures in Cochran Lake, Michigan during June 1978. The cladoceran *Sida crystallina* rapidly declined in exclosures with fry, but increased in control exclosures without fry. Chironomids and chydorids showed little change in the exclosures. Invertebrate populations and foraging by fry were also monitored in the lake during 1976 and 1979. *Sida* declined rapidly in June of both years. In 1979, a decline from 2.2×10^3 to 0.3×10^3 individuals per m^2 and a sharp drop in the proportion of adults between 19 and 22 June coincided with the entry of a large school of fry into the study site on 19 June. Chironomids also declined during June of both years, while chydorids became increasingly abundant in mid-summer and showed no evidence of depletion by the fish. These results suggest that populations of certain prey, which are found locally in high densites in the littoral zone, may be highly susceptible to brief episodes of intense predation by fish fry.

83-000288 Fedorova, G. V. and K. S. Drozzhina. DAILY FEEDING RHYTHM OF PIKE-PERCH, *STIZOSTEDION LUCIOPERCA*, AND PERCH, *PERCA FLUVIATILIS*, FROM LAKE LADOGA. *J. Ichthyol (Engl. Transl. Vopr. Ikhtiol.)* 22(2):52-60. 1982. SFA 28(1)

[GosNIORKh, Leningrad, USSR]

83-000289 Gorelova, T. A. NOTES ON FEEDING AND GONAD CONDITION IN THREE SPECIES OF THE GENUŚ *GONOSTOMA* (GONOSTOMATIDAE). *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 21(5):82-92. 1981. SFA 28(1)

[Inst. Oceanol., Acad. Sci. USSR, Moscow, USSR] Feeding of the members of the family Gonostomatidae-*Gonostoma elongatum, G. gracile, G. atlanticum*-from 15 to 220 mm was studied in the western tropical part of the Pacific Ocean. The major food of young bristlemouth fishes are Copepoda, Amphipoda, and Euphausiacea, and large fishes (more than 50 mm) feed mainly on Euphausiacea and fryfish. Daily rhythm of feeding is expressed in *G. atlanticum* and *G. elongatum*: the indices of stomach filling and fraction of fresh food is higher in the evenings than during the night, and early morning. The overnight average indices of stomach filling of *G. elongatum* and *G. atlanticum* are several times higher than in *G. gracile*. The peculiarities of feeding of *Gonostoma* in comparison with other mesopelagic planktophagous fishes are discussed.

FOODS/FEEDING (CONTINUED)

83-000290 Hassler, T. J. EFFECT OF TEMPERATURE ON SURVIVAL OF NORTHERN PIKE EMBRYOS AND YOLK-SAC LARVAE. *Prog. Fish-Cult.* 44(4):174-178. Oct. 1982. SFA 28(1)
[Calif. Coop. Fish. Res. Unit, Humboldt State Univ., Arcata 95521]

83-000291 Heming, T. A.; J. E. McInerney and D. F. Alderdice. EFFECT OF TEMPERATURE ON INITIAL FEEDING IN ALEVINS OF CHINOOK SALMON *(ONCORHYNCHUS TSHAWYTSCHA). Can. J. Fish. Aquatic Sci.* 39(12):1554-1562. Dec. 1982. In English with French summ. SFA 28(1)
[Dep. Zool., Univ. British Columbia, Vancouver, BC V6T 1W5, Canada]

83-000292 Hunter, J. R. and H. Dorr. THRESHOLDS FOR FILTER FEEDING IN NORTHERN ANCHOVY, *ENGRAULIS MORDAX. Calif. Coop. Oceanic Fish. Invest.* 23:198-204. Oct. 1982. SFA 28(1)
[NMFS, Southwest. Fish. Cent., La Jolla 92038]

83-000293 Janssen, J. COMPARISON OF SEARCHING BEHAVIOR OF ZOOPLANKTON IN AN OBLIGATE PLANKTIVORE, BLUEBACK HERRING (*ALOSA AESTIVALIS*) AND A FACULTATIVE PLANKTIVORE, BLUEGILL (*LEPOMIS MACROCHIRUS*). *Can. J. Fish. Aquatic Sci.* 39(12):1649-1654. Dec. 1982. In English with French summ. SFA 28(1)
[Biol. Dep., Loyola Univ. Chicago, 6525 N. Sheridan, Chicago, IL]

83-000294 Johnson, J. H. and E. Z. Johnson. DIEL FORAGING IN RELATION TO AVAILABLE PREY IN AN ADIRONDACK MOUNTAIN STREAM FISH COMMUNITY. *Hydrobiologia* 96(1):97-104. 1 Oct. 1982. SFA 28(1)
[Nez Perce Tribe Idaho, Box 365, Lapwai 83543] The diets of the fish community of Trucka Brook, a small stream located in the central Adirondack Mountains in northern New York, were examined in relation to the bottom fauna and invertebrate drift. Measures of overlap were calculated between the diets of each fish species examined, brook trout (*Salvelinus fontinalis*), blacknose dace (*Rhinichthys atratulus*), creek chub (*Semotilus atromaculatus*) and pearl dace (*Semotilus margarita*). Overlap was also examined between the fish diets and bottom and drift samples. Blacknose dace, pearl dace and brook trout had the most similar diets which were closely associated with the benthos. Creek chub had the most distinctive diets which did not compare well with any other fish species during either diurnal or nocturnal periods. The mayfly nymph *Litobranchia recurvata* was the most abundant bottom invertebrate and was the major prey of benthic feeding fishes. The invertebrate drift did not compare favorably with any of the fishes' diets because of the predominance of large cased limnephilid larvae (primarily *Psychoglypha* sp.) which were not readily consumed by fish.

83-000295 Johnson, J. H. SUMMER FEEDING ECOLOGY OF THE BLACKNOSE DACE, *RHINICHTHYS ATRATULUS*, IN A TRIBUTARY OF LAKE ONTARIO. *Can. Field-Nat.* 96(3):282-286. July-Oct. 1982. SFA 28(1)
[Nez Perce Tribe Idaho, P.O. Box 365, Lapwai 83540] The summer feeding ecology of Blacknose Dace, *Rhinichthys atratulus*, was studied in Orwell Brook, a New York tributary of Lake Ontario. Chironomid larvae were the major prey of the 360 Blacknose Dace examined although their contribution to diet generally decreased from June to September. Chironomid larvae were also the principal prey consumed during each 4-h sampling interval for 24 h during July. Blacknose Dace fed heaviest during crepuscular periods with peak feeding occurring from 1600-2000 h and another minor peak from 0400-0800 h.

FOODS/FEEDING (CONTINUED)

83-000296 Karpenko, V. I. DIURNAL FEEDING RHYTHM OF YOUNG SALMON DURING THE INITIAL STAGE OF MARINE LIFE. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 22(2):131-134. 1982. SFA 28(1)
[KoTINRO, Petropavlovsk-Kamchatskiy, USSR]

83-000297 Kelso, W. E. and J. J. Ney. ELECTIVITY AND TROPHIC OVERLAP BETWEEN POSTLARVAL SMALLMOUTH AND SPOTTED BASS IN CLAYTOR LAKE, VIRGINIA. *Va. J. Sci.* 33(3):112. 1982. Abstract only. SFA 28(1)
[Dep. Fish. Wildl. Sci., VPI&SU, Blacksburg, VA 24061] The magnitude of trophic competition among postlarval young-of-the-year fishes has not been defined. These interactions may be intense in mainstream reservoirs where littoral nursery areas are limited. Measures of niche overlap combined with data on food abundance can be used to indicate the probable significance of these competitive interactions. Niche overlap between postlarval smallmouth and spotted bass was measured along three axes of the trophic niche: food type, food size, and feeding periodicity. Overlap between the two species was high as both preyed on copepods, *Bosmina longirostris*, and a variety of littoral chydorid cladocerans. Temporal partitioning seemed unlikely as stomach contents indicated feeding during most of the daylight hours. In Claytor Lake, smallmouth bass utilized most of the lake for reproduction and early growth, while spotted bass are restricted to a few small coves. Results indicate smallmouth bass may inhibit spotted bass growth during the critical postlarval period.

83-000298 Khorevin, L. D.; V. A. Rudnev and A. P. Shershnev. PREDATION ON JUVENILE PINK SALMON BY PREDATORY FISHES DURING THE PERIOD OF THEIR SEAWARD MIGRATION ON SAKHALIN ISLAND. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 21(6):47-53. 1981. SFA 28(1)
[Sakhalin Br. Pac. Fish. Oceanogr. Res. Inst., Yuzhno-Sakhalinsk, USSR] The pink salmon, *Oncorhynchus gorbuscha*, is subject to high mortality during its migration in the flood periods which erode the spawning grounds and causes drift of larvae physiologically unprepared for migration. Predators feed most intensively on juvenile pink salmon during the first and more intensive flood, subsequently predation on the fry is less even under large increase in flow. The quantity of fry during downstream migration was not high in the stomachs of predatory fishes, less than one fish per predator. *Salvelinus leucomaenis* preys on young pink salmon much more than Arctic char, *Salvelinus alpinus*, and cherry salmon, *Oncorhynchus masou*.

83-000299 Knight, R. L. and F. J. Margraf. ESTIMATING STOMACH FULLNESS IN FISHES. *N. Am. J. Fish. Manage.* 2(4):413-414. 1982. SFA 28(1)
[Ohio Coop. Fish. Res. Unit, 1735 Neil Ave., Columbus 43210]

83-000300 Krska, R. J., Jr. and R. L. Applegate. FOOD OF YOUNG MUSKELLUNGE IN A POWER PLANT COOLING RESERVOIR. *Prog. Fish-Cult.* 44(4):172-173. Oct. 1982. SFA 28(1)
[Mass. Coop. Fish. Res. Unit, Univ. Mass., Amherst 01002]

83-000301 Magnhagen, C. and A. M. Wiederholm. FOOD SELECTIVITY VERSUS PREY AVAILABILITY: A STUDY USING THE MARINE FISH *POMATOSCHISTUS MICROPS*. *Oecologia (Berl.)* 55(3):311-315. 1982. SFA 28(1)
[Dep. Zool., Uppsala Univ., Box 561, S-751 22 Uppsala, Sweden]

83-000302 Mathias, J. A. and S. Li. FEEDING HABITS OF WALLEYE LARVAE AND JUVENILES: COMPARATIVE LABORATORY AND FIELD STUDIES. *Trans. Am. Fish. Soc.* 111(6):722-735. Nov. 1982. SFA 28(1)
[Freshwater Inst., 501 University Crescent, Winnipeg, MB R3T 2N6, Canada]

FOODS/FEEDING (CONTINUED)

83-000303 Michaletz, P. H.; C. F. Rabeni; W. W. Taylor and T. R. Russell. FEEDING ECOLOGY AND GROWTH OF YOUNG-OF-THE-YEAR PADDLEFISH IN HATCHERY PONDS. *Trans. Am. Fish. Soc.* 111(6):700-709. Nov. 1982. SFA 28(1)
[S. Dak. Game Fish Parks Dep., Yankton 57078]

83-000304 Miller, G. L. ASPECTS OF MORPHOLOGY AND TROPHIC ECOLOGY IN A GUILD OF STREAM FISHES. *Ph.D. dissertation, Miss. State Univ.* 106p. 1982. From Diss. Abstr. Int. B Sci. Eng. 43(7):2100. Jan. 1983. SFA 28(1)
This study examines (1) aspects of the eco-morphology a a guild of benthic stream fishes, (2) the comparative trophic ecology of two closely-related benthic stream fishes, *Percina sciera* and *P. ouachitae* and (3) the trophic ontogeny and ecology of the frecklebelly madtom, *Noturus munitus*. An eco-morphological model was applied to a guild of benthic stream fishes from the Tombigbee River, Mississippi. The model described structuring in the guild based on several aspects of the morphology. Distinct groups of species were observed in the morphological space described by the model. The effect of indeterminate growth was not of sufficient magnitude to change the constructs of the morphological space across seasons. However, species associations within the space changed from Spring to Fall. Aspects of the trophic ecology of *Percina sciera* and *P. ouachitae* from the Tombigbee River were compared to (1) determine the extent of seasonal, sexual and size class trophic allocation in the two species, (2) describe the feeding habits of the two species and compare these habits to members of the syntopic guild of benthic fishes in the river and (3) to determine if a relationship exists between species' morphology and prey characteristics. The two species had similar euryphagus diets which corresponded closely to diets described for darters of similar habits. Diet complement changed seasonally in both species. *Percina sciera* took larger prey than *P. ouachitae* in the Fall months and this related to differences in standard length. Differences in prey selectivity occurred in females but not males and these differences were greater in the Spring. Few morphological traits were highly correlated with prey size. The importance of trophic competition is discussed. Aspects of the trophic ecology of *Noturus munitus* from the Tombigbee River were described. Aquatic insect larvae comprised the bulk of the diet. *Noturus munitus* differed little in gut content from a guild of syntopic species. Males and females were found to differ in mean prey length in the Fall. Individual trophic diversity increased significantly in the Fall for both sexes and with standard length. Morphological characteristics were not correlated with prey characteristics.

83-000305 Schmitt, R. J. and J. A. Coyer. THE FORAGING ECOLOGY OF SYMPATRIC MARINE FISH IN THE GENUS *EMBIOTOCA* (EMBIOTOCIDAE): IMPORTANCE OF FORAGING BEHAVIOR IN PREY SIZE SELECTION. *Oecologia (Berl.)* 55(3):369-378. 1982. SFA 28(1)
[Dep. Biol. Sci., Univ. Calif., Santa Barbara 93106]

83-000306 Talent, L. G. FOOD HABITS OF THE GRAY SMOOTHHOUND, *MUSTELUS CALIFORNICUS*, THE BROWN SMOOTHHOUND, *MUSTELUS HENLEI*, THE SHOVELNOSE GUITARFISH, *RHINOBATOS PRODUCTUS*, AND THE BAT RAY, *MILIOBATIS CALIFORNICA*, IN ELKHORN SLOUGH, CALIFORNIA. *Calif. Fish Game* 68(4):224-234. Oct. 1982. SFA 28(1)
[Dep. Zool., Okla. State Univ., Stillwater 74078] The food habits of four elasmobranch fishes, collected from October 1971, through December 1972, were examined. The study took place in Elkhorn Slough, a shallow estuary near Moss Landing, California. Gray smoothhound sharks fed primarily on crabs in Elkhorn Slough; the yellow shore crab, *Hemigrapsus oregonensis*, was the most important food item for all sizes of gray smoothhounds, but three species of *Cancer* crabs were also important food items. Brown smoothhound sharks fed mostly on crustaceans, with *H. oregonensis*, *Cancer gracilis*, and *Cancer productus* being the most important crustaceans; fishes were important food items for larger sharks. Shovelnose guitarfish fed

FOODS/FEEDING (CONTINUED)

83-000306 CONTINUED mostly on crustaceans, with *H. oregonensis* being the most important food item in all sizes of this guitarfish. Bat rays fed mostly on clams and the echiuroid worm, *Urechis caupo*. Small bat rays fed primarily on small clams, but there was a transition from clams as the major food source to *U. caupo* in bat rays greater than 80 cm disc width.

83-000307 Tricas, T. C. BIOELECTRIC-MEDIATED PREDATION BY SWELL SHARKS, *CEPHALOSCYLLIUM VENTRIOSUM*. *Copeia* 1982(4):948-952. 21 Dec. 1982. SFA 28(1)
[Dep. Zool., Univ. Hawaii Manoa, Honolulu 96822]

83-000308 Visser, M. PREY SELECTION BY THE THREE-SPINED STICKLEBACK (*GASTEROSTEUS ACULEATUS* L.). *Oecologia (Berl.)* 55(3):395-402. 1982. SFA 28(1)
[Dep. Zool., Anim. Ecol. Res. Group, South Parks Rd., Oxford, England]

AGE AND GROWTH

83-000309 Cech, J. J., Jr.; M. J. Massingill and H. Stern. GROWTH OF JUVENILE SACRAMENTO BLACKFISH, *ORTHODON MICROLEPIDOTUS* (AYRES). *Hydrobiologia* 97(1):75-80. 12 Nov. 1982. SFA 28(1)
[Wildl. Fish. Biol., Univ. Calif., Davis 95616] Growth rates of juvenile (1-8g) Sacramento blackfish, an omnivorous California cyprinid which grows to >1.5 kg. were measured at three temperature ranges in laboratory aquaria where several diets were offered *ad lib*. and at four stocking densities in small ponds where natural food was available. Growth rates generally increased with elevations in environmental temperature. Growth in aquaria was possible with strictly plant-based diets, but was faster with pelleted diets higher in protein, lipids, and total calories. Growth rates in ponds increased with decreased stocking densites and approximated or exceeded those measured in laboratory aquaria for blackfish fed pelleted diets. The data also support the importance of energy-rich food organisms (e.g., zooplankton) in the diet of young-of-the-year blackfish in Clear Lake, California.

83-000310 Corey, P. D.; D. A. Leith and M. J. English. A GROWTH MODEL FOR COHO SALMON INCLUDING EFFECTS OF VARYING RATION ALLOTMENTS AND TEMPERATURE. *Aquaculture* 30(1-4):125-143. Jan. 1983. SFA 28(1)
[Dep. Civil. Eng., Oreg. State Univ., Corvallis]

83-000311 Ernst, M. E. and J. Nielsen. ALDER OG VÆKST HOS STALLINGEN (*THYMALLUS THYMALLUS* (L.)) I DANMARK. [AGE AND GROWTH OF THE GRAYLING (*THYMALLUS THYMALLUS* (L.)) IN DENMARK.] *Medd. Ferskvandsfiskeritab. Dan. Fish.-Havunders.* 1/82. 24p. 1982. In Danish with English summ. SFA 28(1)
[Lysbrogade 52, DK-8600 Silkeborg, Denmark] The paper describes the seasonal and annual growth conditions in some Danish grayling populations. It is shown that in the immature yearclasses growth starts in mid-April, whereas in the mature graylings the real growth season starts after the spawning in mid-May. Growth stops in Sept./Oct. when watertemperature decreases and the photoperiod shortens. During winter growth expressed as length is negligible for all yearclasses, whereas weight and conditionfactor increase considerably in the mature individuals, caused by the formation of sexual products in these yearclasses. In general growth increment is greatest in the youngest yearclasses and decreases with age. When comparing on an annual basis the

AGE AND GROWTH (CONTINUED)

83-000311 CONTINUED growth conditions in different Danish grayling populations growth increment varies from one river system to another and even between individual streams within the same river system. These differences are of an environmental nature, and in this respect the trophic state of the streams seems to be essential.

83-000312 FAO of the UN. GENERAL FISHERIES COUNCIL FOR THE MEDITERRANEAN (GFCM) REPORT OF THE TECHNICAL CONSULTATION ON METHODOLOGIES USED FOR FISH AGE-READING. *FAO Fish. Rep.* No. 257. viii + 104p. 1982. In English and French. SFA 28(1)
[Rome, Italy]

83-000313 Kaev, A. M. AGE AND GROWTH OF CHUM SALMON, *ONCORHYNCHUS KETA*, FROM ITURUP ISLAND. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 21(6):54-60. 1981. SFA 28(1)
[Sakhalin Br. Pac. Fish. Oceanogr. Res. Inst., Yuzhno-Sakhalinsk, USSR] The spawning run of Chum salmon, *Oncorhynchus keta*, consists of three age groups: 2+, 3+, and 4+. The average number of circuli laid down per year on the scales differs little between different year-classes. No relationship has been established between the length of fish of similar age and number of circuli on their scales. The scales of the Kuril salmon have a large last "summer" growth and widely spaced circuli in this zone. A more rapid maturation with enhanced growth is also a characteristic property of chum salmon from the Iturup Island.

83-000314 Karas, P. and E. Neuman. FIRST-YEAR GROWTH OF PERCH (*PERCA FLUVIATILIS* L.) AND ROACH (*RUTILUS RUTILUS* (L.)) IN A HEATED BALTIC BAY. *Inst. Freshwater Res. Drottningholm Rep.* No. 59. 48-63. 1981. SFA 28(1)
[Res. Dep., Natl. Swedish Environ. Prot. Board, S-740 71 Oregrund, Sweden] Studies were made on the first year of life of the year-classes 1971-76 with regard to length, growth, length distribution, condition and abundance. About 16,000 fry of perch and about 18,000 of roach were collected by means of underwater detonations in two Baltic bays, one of which receives heated water from a nuclear power station. Growth occurred to the highest temperatures observed, 30-31°C. Under natural conditions there is no growth after October, but in heated water a length increment occurs in the winter. It is small, however, which is suggested to be due to the short daylength. There was a positive relationship between the growth rate and the inter-year variations in temperature between ca 10 and 20-25°C, which can be described by a straight line or an exponential function. Size-dependent mortality during the winter was not observed. Condition was demonstrated to be better in warm years than in cold. It varies seasonally in a similar way for perch and roach, with good condition in the summer and poor in the winter. Inter-year variations in abundance of fry appear to be positively correlated to the temperature during the summer and early part of the autumn. The reasons for this are discussed, especially as regards the importance of condition.

83-000315 Kelle, W. PROBLEME UND METHODEN DER ALTERSBESTIMMUNG AN *NOTOTHENIA GIBBERIFRONS* LÖNNBERG, 1905. [PROBLEMS AND METHODS IN THE AGEING OF *NOTOTHENIA GIBBERIFRONS*, LÖNNBERG, 1905.] *Arch. Fischereiwiss.* 33(1-2):69-78. Nov. 1982. SFA 28(1)
[Inst. Küsten- Binnenfisch. Bundesforsch. Fisch., Hamburg, West Germany]

AGE AND GROWTH (CONTINUED)

83-000316 Kovtun, A. A. AGE AND GROWTH OF AUTUMN CHUM SALMON, *ONCORHYNCHUS KETA*, FROM SAKHALIN. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 21(6):61-69. 1981. SFA 28(1)
[Sakhalin Br. Pac. Fish. Oceanogr. Res. Inst., Yuzhno-Sakhalinsk, USSR] On the basis of several years' observations (1952-1978), a change in the age structure and its relationship with the length of autumn chum salmon has been demonstrated. Trends in growth as well as growth peculiarities have been revealed which can be used for differentiation of populations which may be used in fish culture.

83-000317 Lough, R. G.; M. Pennington; G. R. Bolz and A. A. Rosenberg. AGE AND GROWTH OF LARVAL ATLANTIC HERRING, *CLUPEA HARENGUS* L., IN THE GULF OF MAINE-GEORGES BANK REGION BASED ON OTOLITH GROWTH INCREMENTS. *NOAA Fish. Bull.* 80(2):187-199. Apr. 1982. SFA 28(1)
[NMFS, Woods Hole, MA 02543]

83-000318 Margenau, T. L. MODIFIED PROCEDURE FOR AGING WALLEYES BY USING DORSAL SPINE SECTIONS. *Prog. Fish-Cult.* 44(4):204. Oct. 1982. SFA 28(1)
[Wis. Dep. Nat. Resour., P.O. Box 125, Brule 54820]

83-000319 Matěnová, A. DAS ALTER UND WACHSTUM DES BLEIES (*ABRAMIS BRAMA*) IN ORLÍK-STAUSEE. [AGE AND GROWTH OF BREAM (*ABRAMIS BRAMA*) IN ORLIK-STAUSEE.] *Acta Univ. Carolinae Biol.* 3-4:169-192. 1980. SFA 28(1)
[Opatovická 2207, 370 10 Cêské Budejovicê-Nemanice, Czechoslovakia]

83-000320 Novák, J. GROWTH, ABUNDANCE AND PRODUCTION OF THE RUDD (SCARDINIUS ERYTHROPHTHALMUS) IN SOME BACKWATERS IN THE LABE INUNDATION REGION, CZECHOSLOVAKIA (PISCES: CYPRINIDAE). *Acta Univ. Carolinae Biol.* 3-4:193-212. 1980. SFA 28(1)
[U Sparty 16, 170 00 Praha 7, Czechoslovakia]

83-000321 Powell, A. B. ANNULUS FORMATION ON OTOLITHS AND GROWTH OF YOUNG SUMMER FLOUNDER FROM PAMLICO SOUND, NORTH CAROLINA. *Trans. Am. Fish. Soc.* 111(6):688-693. Nov. 1982. SFA 28(1)
[NMFS, Beaufort Lab., Beaufort, NC 28516-9722]

83-000322 Rosenberg, A. A. GROWTH OF JUVENILE ENGLISH SOLE, *PAROPHRYS VETULUS*, IN ESTUARINE AND OPEN COASTAL NURSERY GROUNDS. *NOAA Fish. Bull.* 80(2):245-252. Apr. 1982. SFA 28(1)
[Dep. Biol., Dalhousie Univ., Halifax, NS B3H 4J1, Canada]

83-000323 Smith, H. A. and P. A. Slaney. AGE, GROWTH, SURVIVAL AND HABITAT OF ANADROMOUS DOLLY VARDEN (*SALVELINUS MALMA*) IN THE KEOGH RIVER, BRITISH COLUMBIA. *B.C. Fish. Tech. Circ.* No. 76. ii + 50p. 1980. SFA 28(1)

83-000324 Townsend, D. W. and R. F. Shaw. DAILY GROWTH INCREMENTS IN OTOLITHS OF BLUE WHITING, *MICROMESISTIUS POUTASSOU* (RISSO) FROM ABOVE THE ARCTIC CIRCLE. *Sarsia* 67(3):143-147. 1982. SFA 28(1)
[Bigelow Lab. Ocean Sci., W. Boothbay Harbor, ME 04575] Otoliths from fishes collected at 45°N and 74°N latitude were examined with the scanning electron microscope. The relationship between the numbers of microstructural

AGE AND GROWTH (CONTINUED)

83-000324 CONTINUED growth increments and the estimated ages of the specimens supported previous contentions that such increments are deposited with a daily periodicity, even in fishes living above the Arctic Circle. The solar light regime above the Arctic Circle is discussed in addition to other environmental cues which could possibly trigger the deposition of daily growth increments in fish otoliths.

83-000325 Victor, B. C. and E. B. Brothers. AGE AND GROWTH OF THE FALLFISH *SEMOTILUS CORPORALIS* WITH DAILY OTOLITH INCREMENTS AS A METHOD OF ANNULUS VERIFICATION. *Can. J. Zool.* 60(11):2543-2550. Nov. 1982. In English with French summ. SFA 28(1)

[Dep. Biol. Sci., Univ. Calif., Santa Barbara 93106] Daily increments were found in the otoliths of the fallfish *Semotilus corporalis* from three stream populations in central New York. By counting these increments one can verify annual marks and validate other less precise methods of aging. Results suggested that a false first annulus was observed in the only previous study of fallfish age and growth. Annual growth in length is shown to be linear. All three populations' growth rates were significantly different. Furthermore, the difference among these local populations can account for much of the variability in the rate of growth exhibited throughout the species' range. It is therefore proposed that the nature of the local habitat, in paritcular the size of the stream and the density of conspecifics, may be the major determinant of the rate of growth in the fallfish.

83-000326 Villiers, L. THE FEEDING OF JUVENILE GOBY *DELTENTOSTEUS QUADRIMACULATUS* (PISCES, GOBIIDAE). *Sarsia* 67(3):157-162. 1982. SFA 28(1)

[DIRCEN, Serv. Mixte de Contrôle Biol., B.P. 16, F-91310 Montlhéry, France]

83-000327 Wiener, J. G. and W. R. Hanneman. GROWTH AND CONDITION OF BLUEGILLS IN WISCONSIN LAKES: EFFECTS OF POPULATION DENSITY AND LAKE pH. *Trans. Am. Fish. Soc.* 111(6):761-767. Nov. 1982. SFA 28(1)

[U.S. FWS, P.O. Box 936, La Crosse, WI 54601]

83-000328 Wilson, R. R., Jr. A COMPARISON OF AGES ESTIMATED BY THE POLARIZED LIGHT METHOD WITH AGES ESTIMATED BY VERTEBRAE IN FEMALES OF *CORYPHAENOIDES ACROLEPIS* (PISCES: MACROURIDAE). *Deep-Sea Res. A Oceanogr. Res. Pap.* 29(11):1373-1379. 1982. SFA 28(1)

[Scripps Inst. Oceanogr., A-008, Univ. Calif., La Jolla 92093] Rings of scales seen by the use of polarized light are compared to those of vertebral centra of the Pacific grenadier *Coryphaenoides acrolepis* (Bean). Although the number of rings in the two structures from the same individual show significant statistical agreement, strict numerical agreement occurred in only 22 out of 100 comparisons. Ageing by either technique produced comparable logistic growth curves.

GEOGRAPHICAL DISTRIBUTION, FISH SURVEYS, ETC.

83-000329 Bello, G. and F. C. Conti. REPERIMENTO DI *SALMO GAIRDNERI* RICH. (OSTEICHTHYES, SALMONIDAE) NEL BASSO ADRIATICO. [FINDING OF *SALMO GAIRDNERI* RICH. (OSTEICHTHYES, SALMONIDAE) IN THE LOWER ADRIATIC SEA.]

GEOGRAPHICAL DISTRIBUTION, FISH SURVEYS, ETC. (CONTINUED)

83-000329 CONTINUED *Riv. It. Piscic. Ittiop.* 17(3):123-124. 1982. In Italian with English summ. SFA 28(1)
[Lab. Prov. Biol. Mar., Molo Pyzzoli, 70123 Bari, Italy]

83-000330 Belyanina, T. N. LARVAE AND FINGERLINGS OF DEEP-WATER FISHES FROM THE BENTHIC ZONE OF THE THALASSOBATHYAL IN THE EASTERN INDIAN OCEAN. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 21(5):75-81. 1981. SFA 28(1)
[Inst. Oceanol., Acad. Sci. USSR-IOAN, Moscow, USSR] In the samples made in the eastern Indian Ocean during trawlings in the bottom layers over the East Indian and West Australian ridges, the "Star of Crimea" bank and the Exmuth plateau, larvae, fingerlings and adult fishes (genus *Cyclothone*) of about 30 species belonging to 12 families were found. The paucity of species and quantity of fishes in the samples over the East Indian ridge is explained by the oligotrophic nature of this region. The usual inhabitants of the mesopelagic zone of the Indian Ocean are rare in the samples and fishes belonging to the species living in deeper water are found in larger numbers, which is explained by a comparatively low catch efficiency during lifting of the net.

83-000331 Brundage, H. M. III and R. E. Meadows. THE ATLANTIC STURGEON, *ACIPENSER OXYRHYNCHUS*, IN THE DELAWRE RIVER ESTUARY. *NOAA Fish. Bull.* 80(2):337-343. Apr. 1982. SFA 28(1)
[Ichthyological Assoc., Inc., 100 South Cass St., Middletown, DE 19709]

83-000332 Caspers, H. and C. W. Heckman. THE BIOTA OF A SMALL STANDING WATER ECOSYSTEM IN THE ELBE FLOOD PLAIN. THE ROLE OF DISTRICTS FREE FROM PESTICIDE SPRAYS AS HAVENS FOR ENDANGERED AQUATIC SPECIES. *Arch. Hydrobiol. Supplementb.* 61(3):227-316. 1982. SFA 28(1)
[Inst. Hydrobiol. Fishchereiwiss., Univ. Hamburg, West Germany]

83-000333 Courtenay, W. R., Jr. and J. E. Deacon. STATUS OF INTRODUCED FISHES IN CERTAIN SPRING SYSTEMS IN SOUTHERN NEVADA. *Great Basin Nat.* 42(3):361-366. 30 Sept. 1982. SFA 28(1)
[Dep. Biol. Sci., Fla. Atl. Univ., Boca Raton 33431] We record eight species of exotic fishes as established, reproducing populations in certain springs in Clark, Lincoln, and Nye counties, Nevada. These include an unidentified species of *Hypostomus*, *Cyprinus carpio*, *Poecilia mexicana*, *Poecilia reticulata*, a *Xiphophorus* hybrid, and *Chichlasoma nigrofasciatum*. *Tilapia mariae*, established in a spring near the Overton Arm of Lake Mead, and *Tilapia zilli*, established in a golf course pond in Pahrump Valley, are recorded for the first time from Nevada waters. Though populations of transplanted *Gambusia affinis* persist, other populations of *Poecilia latipinna* are apparently no longer extant. *Cichlasoma severum*, *Notemigonus crysoleucas*, *Poecilia latipinna*, and *Carassius auratus* were apparently eradicated from Rogers Spring in 1963.

83-000334 Domanevskaya, M. V. SPECIFICS OF THE DISTRIBUTION OF *PAGELLUS ACARNE* (SPARIDAE) IN THE SOUTHWESTERN MEDITERRANEAN SEA. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 22(2):127-130. 1982. SFA 28(1)
[AtlantNIRO, Kaliningrad, USSR]

83-000335 Gritsenko, O. F. POPULATION STRUCTURE OF PINK SALMON, *ONCORHNUCHUS GORBUSCHA*. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 21(5):16-28. 1981. SFA 28(1)
[All-Union Fish. Oceanogr. Res. Inst., VNIRO, Moscow, USSR]

GEOGRAPHICAL DISTRIBUTION, FISH SURVEYS, ETC. (CONTINUED)

83-000336 Gruber, D.; E. H. Ahlstrom and M. M. Mullin. DISTRIBUTION OF ICHTHYOPLANKTON IN THE SOUTHERN CALIFORNIA BIGHT. *Calif. Coop. Oceanic Fish. Invest.* 23:172-179. Oct. 1982. SFA 28(1)
[Inst. Mar. Resour., A-018, Univ. Calif., La Jolla 92093]

83-000337 Imsand, S. ABUNDANCE IN SPACE AND TIME OF LANTERNFISHES OF THE GENUS *TRIPHOTURUS* (MYCTOPHIDAE) IN THE PACIFIC OCEAN. *Ph.D. dissertation, Univ. Calif. (San Diego)* 247p. 1982. From Diss. Abstr. Int. B Sci. Eng. 43(5):1332. Nov. 1982. SFA 28(1)

83-000338 Jones & Stokes Assoc., Inc. AN ECOLOGICAL CHARACTERIZATION OF THE CENTRAL AND NORTHERN CALIFORNIA COASTAL REGION. *U.S. Fish Wildl. Serv.* FWS/OBS-80/45,46.1,46.2,47.1,47.2,48.1,48.2, and 49. 4087p. Oct. 1981. An 8-part publication. Available from Inf. Transfer Spec., Natl. Coastal Ecosyst. Team, TNASA-Slidell Computer Complex, 1010 Gause Blvd., Slidell, LA 70458. SFA 28(1)

83-000339 Kovtsova, M. V. FEATURES OF THE DISTRIBUTION AND MIGRATION OF PLAICE, *PLEURONECTES PLATESSA*, IN THE BARENTS SEA IN 1970-1978. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 22(1):51-62. 1982. SFA 28(1)
[PINRO, Murmansk, USSR]

83-000340 Laskowski-Hoke, R. A.; M. J. Norrocky and B. L. Prater. FISHES OF THE UPPER PORTAGE RIVER, OHIO, 1973-1975. *Ohio J. Sci.* 82(5):306-310. Dec. 1982. SFA 28(1)
[Aqua Tech Environ. Consult., Inc., P.O. Box 76, Melmore, OH 44845]

83-000341 Marsh, P. C. and W. L. Minckley. FISHES OF THE PHOENIX METROPOLITAN AREA IN CENTRAL ARIZONA. *N. Am. J. Fish. Manage.* 2(4):395-402. 1982. SFA 28(1)
[Cent. Environ. Stud., Ariz. State Univ., Tempe 85287]

83-000342 Middleton, M. J. THE ORIENTAL GOBY, *ACANTHOGOBIUS FLAVIMANUS* (TEMMINCK AND SCHLEGEL), AN INTRODUCED FISH IN THE COASTAL WATERS OF NEW SOUTH WALES, AUSTRALIA. *J. Fish Biol.* 21(5):513-523. Nov. 1982. SFA 28(1)
[N.S.W. State Fish., 211 Kent St., Sydney, N.S.W., Australia 2000]

83-000343 Parin, N. V. and M. F. Svetlov. *SCOPELOSAURUS HAMILTONI* (NOTOSUDIDAE) IN THE SCOTIA SEA. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 21(5):113-114. 1981. SFA 28(1)
[IOAN, Moscow, USSR]

83-000344 Paulin, C. D.; G. Habib; C. L. Carey; P. M. Swanson and G. J. Voss. NEW RECORDS OF *MOBULA JAPANICA* AND *MASTURUS LANCEOLATUS*, AND FURTHER RECORDS OF *LUVARIS IMPERIALIS* (PISCES: MOBULIDAE, MOLIDAE, LOUVARIDAE) FROM NEW ZEALAND. *N.Z. J. Mar. Freshwater Res.* 16(1):11-17. 1982. SFA 28(1)
[Natl. Mus. N.Z., Private Bag, Wellington, New Zealand]

83-000345 Pinchuk, V. I. and M. Y. Savchuk. SPECIES COMPOSITION OF THE GENUS *POMATOSCHISTUS* (GOBIIDAE) IN THE SEAS OF THE USSR. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 22(1):7-12. 1982. SFA 28(1)
[Kherson Hydrobiol. Stn., Inst. Hydrobiol., Ukrainian Acad. Sci., USSR]

GEOGRAPHICAL DISTRIBUTION, FISH SURVEYS, ETC. (CONTINUED)

83-000346 Poletayev, V. A. and V. N. Shibanov. A SECOND RECORD OF THE WHITE SKATE, *RAJA LINTEA*, ON THE BOUNDARY OF THE NORWEGIAN AND BARENTS SEA. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 22(1):148-150. 1982. SFA 28(1)
[PINRO, Murmansk, USSR]

83-000347 Roberts, T. R. SYSTEMATICS AND GEOGRAPHICAL DISTRIBUTION OF THE ASIAN SILURID CATFISH GENUS *WALLAGO*, WITH A KEY TO THE SPECIES. *Copeia* 1982(4):890-894. 21 Dec. 1982. SFA 28(1)
[Dep. Ichthyol., Calif. Acad. Sci., Golden Gate Park, San Francisco 94118]

83-000348 Sulak, K. J. and J. A. Musick. COMPOSITION AND ECOLOGY OF THE BOTTOMFISH FAUNA OF THE VIRGINIA CONTINENTAL SLOPE. *Va. J. Sci.* 33(3):120. 1982. Abstract only. SFA 28(1)
[Dep. Ichthyol., Coll. William and Mary, Gloucester Point, VA 23062]

83-000349 Thompson, B. A. and L. A. Deegan. DISTRIBUTION OF LADYFISH (*ELOPS SAURUS*) AND BONEFISH (*ALBULA VULPES*) LEPTOCEPHALI IN LOUISIANA. *Bull. Mar. Sci.* 32(4):936-939. Oct. 1982. SFA 28(1)
[Coast. Ecol. Lab., Cent. Wetland Resour., La. State Univ., Baton Rouge 70803-7507]

83-000350 Trunov, I. A. SPECIES OF THE FAMILY REGALECIDAE (LAMPRIDIFORMES) FROM THE SOUTHEASTERN ATLANTIC OCEAN. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 22(1):1-6. 1982. SFA 28(1)
[AtlantNIRO, Kaliningrad, USSR]

83-000351 Tsai, C. and J. A. Fava. HABITATS AND DISTRIBUTION OF THE PEARL DACE, *SEMOTILUS MARGARITA* (COPE), IN THE POTOMAC RIVER DRAINAGE. *Va. J. Sci.* 33(4):201-205. 1982. SFA 28(1)
[Univ. Md., Chesapeake Biol. Lab., Solomons 20688]

83-000352 Yefremenko, V. N. A FINDING OF *BATHYLAGUS ANTARCTIUS* (BATHYLAGIDAE) EGGS, THEIR CHARACTERISTICS AND DISTRIBUTION IN THE SCOTIA SEA. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 22(2):135-137. 1982. SFA 28(1)

83-000353 Yoshiyama, R. M.; J. Holt; S. Holt; R. Godbout and D. E. Wohlschlag. ABUNDANCE AND DISTRIBUTION PATTERNS OF DEMERSAL FISHES ON THE SOUTH TEXAS OUTER CONTINENTAL SHELF: A STATISTICAL DESCRIPTION. *Contrib. Mar. Sci.* 25:61-84. Aug. 1982. SFA 28(1)
[Environ. Sci. Div., Oak Ridge Natl. Lab., P.O. Box X, Oak Ridge, TN 37830]

ABUNDANCE, FACTORS OF; SURVIVAL AND MORTALITY

83-000354 Biró, P. and L. Vörös. RELATIONSHIPS BETWEEN PHYTOPLANKTON AND FISH YIELDS IN LAKE BALATON. *Hydrobiologia* 97(1):3-7. 12 Nov. 1982. SFA 28(1)
[Balaton Limnol. Res. Inst., Hungarian Acad. Sci., H-8237 Tihany, Hungary] Coefficients of determination between fish yields in Lake Balaton (kg/ha) and different measurements of phytoplankton abundance were: phytoplankton

ABUNDANCE, FACTORS OF; SURVIVAL AND MORTALITY (CONTINUED)

83-000354 CONTINUED biomass (0.48), chlorophyll a (0.45). The same indices for catch per unit of effort (CUE) proved to be 0.82 and 0.88, respectively. The correlation between fish yields and phytoplankton density has been described in second-degree polynomials.

83-000355 Densen, W. L. T. van and J. Vijverberg. THE RELATIONS BETWEEN 0+ FISH DENSITY, ZOOLPLANKTON SIZE AND THE VULNERABILITY OF PIKEPERCH, *STIZOSTEDION LUCIOPERCA*, TO ANGLING IN THE FRISIAN LAKES. *Hydrobiologia* 95:321-326. 29 Sept. 1982. SFA 28(1)
[Limnol. Inst., Tjeukemmer Lab., De Akkers 47, 8536 VD Oosterzee, The Netherlands] During a five year study, the size and abundance of zooplankton and 0+ fish in September were registered in a number of Frisian lakes. The mean size of *Daphnia* was related to the abundance of planktivorous 0+ fish in September. Immigration of fish larvae into the Frisian Lake District from the IJsselmeer in June was observed in 1979 and 1980. The abundance of 0+ fish was negatively related and the size of *Daphnia* was positively related to the vulnerability to angling of predatory pikeperch.

83-000356 Hartig, J. H.; D. J. Jude and M. S. Evans. CYCLOPOID PREDATION ON LAKE MICHIGAN FISH LARVAE. *Can. J. Fish. Aquatic Sci.* 39(12):1563-1568. Dec. 1982. In English with French summ. SFA 28(1)
[Great Lakes Inst., Univ. Windsor, Windsor, ON N9B 3P4, Canada]

83-000357 Krogius, F. V. THE ROLE OF RESIDENT FISH IN THE REPRODUCTION OF ANADROMOUS SOCKEYE SALMON, *ONCORHYNCHUS NERKA*. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 21(6):14-21. 1981. SFA 28(1)
[Kamchatka Div. Pac. Fish. Oceanogr. Res. Inst., Petropavlovsk-Kamchatskiy, USSR]

83-000358 Svärdson, G. and G. Molin. THE IMPACT OF EUTROPHICATION AND CLIMATE ON A WARMWATER FISH COMMUNITY. *Inst. Freshwater Res. Drottningholm Rep.* No. 59. 142-151. 1981. SFA 28(1)
[Inst. Freshwater Res., S-170 11 Drottningholm, Sweden]

IDENTIFICATION, KEYS, CLASSIFICATION

83-000359 Andriyashev, A. P. A NEW SPECIES AND A NEW SUBSPECIES OF *PARALIPARIS* (LIPARIDAE) FROM WESTERN ANTARCTICA. II. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 22(2):1-9. 1982. SFA 28(1)
[Zool. Inst., Acad. Sci. USSR, Leningrad, USSR]

83-000360 Collette, B. B. SOUTH AMERICAN FRESHWATER NEEDLEFISHES OF THE GENUS *POTAMORRHAPHIS* (BELONIFORMES: BELONIDAE). *Proc. Biol. Soc. Wash.* 95(4):714-747. 20 Dec. 1982. SFA 28(1)
[Natl. Mar. Fish. Serv. Syst. Lab., Natl. Mus. Nat. Hist., Washington, DC 20560]

83-000361 Dawson, C. E. REVIEW OF THE GENUS *MICROGNATHUS* DUNCKER (PISCES: SYNGNATHIDAE), WITH DESCRIPTION OF *M. NATANS*, N. SP. *Proc. Biol. Soc. Wash.* 95(4):657-687. 20 Dec. 1982. SFA 28(1)
[Gulf Coast Res. Lab. Mus., Ocean Springs, MS 39564]

IDENTIFICATION, KEYS, CLASSIFICATION (CONTINUED)

83-000362 Gayet, M. CYPRINIFORME OU GONORYNCHIFORME? *RAMALLICHTHYS*, NOUVEAU GENRRE DU CÉNOMANIEN INFÉRIEUR DE RAMALLAH (MONTS DE JUDÉE). [CYPRINIFORM OR GONORHYNCHIFORM? *RAMALLICHTHYS*, NEW GENUS FROM THE LOWER CENOMANIAN OF RAMALLAH (JUDAEA MOUNTAINS).] *C.R. Hebd. Seances Acad. Sci. Ser. III Sci. Vie* 295(3):163-165. 27 Sept. 1982. In French with English summ. SFA 28(1)
[Mus. Natl. Hist. Nat., Inst. Paleontol., L.A. 12 C.N.R.S., 8 rue de Buffon, 75005 Paris, France]

83-000363 Glubokovskiy, M. K. and I. A. Chereshnev. UNRESOLVED PROBLEMS CONCERNING THE PHYLOGENY OF CHARS (*SALVELINUS*) OF THE HOLARCTIC: I. MIGRATORY CHARS OF THE EAST-SIBERIAN SEA BASIN. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 21(5):1-15. 1981. SFA 28(1)
[Inst. Mar. Biol., Fac. Inst. Res. Cent., Acad. Sci. USSR, Vladivostok, USSR]

83-000364 Goren, M. and I. Karplus. *FOWLERIA ABOCELLATA*, A NEW CARDINAL FISH FROM THE GULF OF ELAT--RED SEA (PISCES, APOGONIDAE). *Zool. Meded. Rijksmus. Nat. Hist. Leiden* 55(20):231-234. 4 Mar. 1980. SFA 28(1)
[Dep. Zool., Tel Aviv Univ., Tel Aviv, Israel]

83-000365 Hardy, G. S. A NEW SPECIES OF *PTERYGOTRIGLA* (PISCES: TRIGLIDAE) FROM NEW ZEALAND. *N.Z. J. Zool.* 9(2):207-210. 1982. SFA 28(1)
[Natl. Mus. N.Z., Private Bay, Wellington, New Zealand]

83-000366 Hutchins, J. B. and J. E. Randall. *CANTHERHINES LONGICAUDUS*, A NEW FILEFISH FROM OCEANIA, WITH A REVIEW OF THE SPECIES OF THE *C. FRONTICINCTUS* COMPLEX. *Pac. Sci.* 36(2):175-185. Apr. 1982. SFA 28(1)
[West. Aust. Mus., Francis St., Perth, W.A. 6000, Australia]

83-000367 Kullander, S. O. CICHLID FISHES FROM THE LA PLATA BASIN. PART III. THE *CRENICICHLA LEPIDOTA* SPECIES GROUP (TELEOSTEI: CICHLIDAE). *Rev. Suisse Zool.* 89(3):627-661. Sept. 1982. SFA 28(1)
[Swed. Mus. Nat. Hist., Sect. Vert. Zool., S-104 05 Stockholm, Sweden]

83-000368 Lagios, M. D. *LATIMERIA* AND THE CHONDRICHTHYES AS SISTER TAXA: A REBUTTAL TO RECENT ATTEMPTS AT REFUTATION. *Copeia* 1982(4):942-948. 31 Dec. 1982. SFA 28(1)
[Dep. Pathol., Children's Hosp. San Francisco, P.O. Box 3805, San Francisco, CA 94119]

83-000369 Lea, R. N. and L. J. Dempster. STATUS AND NOMENCLATURAL HISTORY OF *AGONUS VULSUS* JORDAN AND GILBERT, 1880 (PISCES--FAMILY AGONIDAE). *Calif. Fish Game* 68(4):249-252. Oct. 1982. SFA 28(1)
[Calif. Dep. Fish Game, 2201 Garden Rd., Monterey 92940]

83-000370 Lund, R. *HARPAGOFUTUTOR VOLSELLORHINUS* NEW GENUS AND SPECIES (CHONDRICHTHYES, CHONDRENCHELYIFORMES) FROM THE NAMURIAN BEAR GULCH LIMESTONE, *CHONDRENCHELYS PROBLEMATICA* TRAQUAIR (VISEAN), AND THEIR SEXUAL DIMORPHISM. *J. Paleontol.* 56(4):938-958. July 1982. SFA 28(1)
[Biol. Dep., Adelphi Univ., Garden City, NY 11530]

IDENTIFICATION, KEYS, CLASSIFICATION (CONTINUED)

83-000371 Matthews, W. J.; R. E. Jenkins and J. T. Styron, Jr. SYSTEMATICS OF TWO FORMS OF BLACKNOSE DACE, *RHINICHTHYS ATRATULUS* (PISCES: CYPRINIDAE) IN A ZONE OF SYNTOPY, WITH A REVIEW OF THE SPECIES GROUP. *Copeia* 1982(4):902-920. 21 Dec. 1982. SFA 28(1)
[Dep. Zool., Univ. Okla., Kingston 73439]

83-000372 McEachran, J. D. REVISION OF THE SOUTH AMERICAN SKATE GENUS *SYMPTERYGIA* (ELASMOBRANCHII: RAJIFORMES). *Copeia* 1982(4):867-890. 21 Dec. 1982. SFA 28(1)
[Dep. Wildl. Fish. Sci., Tex. A&M Univ., College Station 77843]

83-000373 Murdy, E. O. and J. D. McEachran. *ISTIGOBIUS HOESEI*, A NEW GOBIID FISH FROM AUSTRALIA (PERCIFORMES: GOBIIDAE). *Proc. Biol. Soc. Wash.* 95(4):642-646. 20 Dec. 1982. SFA 28(1)
[Dep. Wildl. Fish. Sci., Tex. A&M Univ., College Station 77843]

83-000374 Nyman, L.; J. Hammar and R. Gydemo. THE SYSTEMATICS AND BIOLOGY OF LANDLOCKED POPULATIONS OF ARCTIC CHAR FROM NORTHERN EUROPE. *Inst. Freshwater Res. Drottningholm Rep.* No. 59. 128-141. 1981. SFA 28(1)
[Inst. Freshwater Res., S-170 11 Drottningholm, Sweden]

83-000375 Pinchuk, V. I. MISTAKEN IDENTIFICATION OF THE SO-CALLED "DOGFISH," A MEMBER OF THE GRAY SHARK GENUS, *CARCHARHINUS*, FROM OPEN WATERS OF WORLD OCEANS. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 21(5):115-117. 1981. SFA 28(1)
[Kherson Hydrobiol. Stn., Inst. Hydrobiol., Acad. Sci. Ukrainian SSR, USSR]

83-000376 Randall, J. E. and R. H. Kuiter. THREE NEW LABRID FISHES OF THE GENUS *CORIS* FROM THE WESTERN PACIFIC. *Pac. Sci.* 36(2):159-173. Apr. 1982. SFA 28(1)
[Bernice P. Bishop Mus., P.O. Box 19000-A, Honolulu, HI 96819]

83-000377 Roberts, T. R. A REVISION OF THE SOUTH AND SOUTHEAST ASIAN ANGLER-CATFISHES (CHACIDAE). *Copeia* 1982(4):895-901. 21 Dec. 1982. SFA 28(1)
[Dep. Ichthyol., Calif. Acad. Sci., San Francisco 94118]

83-000378 Saldanha, L. and N. R. Merrett. A NEW SPECIES OF THE DEEP-SEA EEL GENUS *ILYOPHIS* GILBERT (SYNAPHOBRANCHIDAE) FROM THE EASTERN NORTH ATLANTIC, WITH COMMENTS ON ITS ECOLOGY AND INTRAFAMILIAL RELATIONSHIPS. *J. Fish Biol.* 21(6):623-636. Dec. 1982. SFA 28(1)
[Musea Bocage - Mar. Stn. Guia, Fac. Sci., Rua Escola Politec., 1200 Libson, Portugal]

83-000379 Sazonov, Y. I. *TALISMANIA BRACHYCEPHALA* SP. N. (ALEPOCEPHALIDAE, SALMONIFORMES)--A NEW SPECIES FROM THE NORTHWESTERN PACIFIC OCEAN. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 21(6):151-153. 1981. SFA 28(1)
[R.P. Shirshov Inst. Oceanol., Acad Sci. USSR-IOAN, Moscow, USSR]

83-000380 Vari, R. P. *CURIMATOPSIS MYERSI*, A NEW CURIMATID CHARACIFORM FISH (PISCES: CHARACIFORMES) FROM PARAGUAY. *Proc. Biol. Soc. Wash.* 95(4):788-792. 21 Dec. 1982. SFA 28(1)

IDENTIFICATION, KEYS, CLASSIFICATION (CONTINUED)

83-000380 CONTINUED
[Dep. Vert. Zool., Natl. Mus. Nat. Hist., Smithsonian Inst., Washington, DC 20560]

83-000381 Vladykov, V. D.; C. B. Renaud; E. Kott and P. S. Economidis. A NEW NONPARASITIC SPECIES OF HOLARCTIC LAMPREY, GENUS *EUDONTOMYZON* REGAN 1911 (PETROMYZONTIDAE), FROM GREECE. *Can. J. Zool.* 60(11):2897-2915. Nov. 1982. In English with French summ. SFA 28(1)
[Dep. Biol., Univ. Ottawa, Ottawa, ON K1N 6N5 Canada]

83-000382 Williams, J. T. and R. L. Shipp. A NEW SPECIES OF THE GENUS *Echiodon* (Pisces: Carapidae) from the Eastern Gulf of Mexico. *Copeia* 1982(4):845-851. 21 Dec. 1982. SFA 28(1)
[Zool. Dep., Fla. State Mus., Univ. Fla., Gainesville 32611]

83-000383 Yiyu, C.; Z. Wei and H. Shunyou. [SPECIATION IN SCHIZOTHORACID FISHES OF LAKE LUGU.] *Acta Zool. Sin.* 28(3):217-225. Sept. 1982. In Chinese with English summ. SFA 28(1)
[Inst. Hydrobiol., Acad. Sinica, China]

PARASITES AND DISEASES-GENERAL

83-000384 Conroy, D. A.; J. Morales; C. Perdomo; R. A. Ruiz and J. A. Santacana. THE PREVENTION AND CONTROL OF DISEASED CONDITIONS IN SOUTH AMERICAN ORNAMENTAL FISH. *Riv. It. Piscic. Ittiop.* 17(3):127-132. 1982. In English and Italian. SFA 28(1)
[Fac. Cienc. Vet., Univ. Cent. Venezuela, Maracay, Venezuela]

83-000385 Hamann, M. I. PARASITOS DEL PACU (*COLOSSOMA MITREI*) DEL RIO PARANA MEDIO, REPUBLICA ARGENTINA (PISCES, SERRASALMIDAE). [PARASITES OF THE "PACÚ" (*COLOSSOMA MITREI*) FROM THE MIDDLE PARANÁ RIVER (PISCES, SERRASALMIDAE).] *Hist. Nat.* 2(18):153-160. 1982. In Spanish with English summ. SFA 28(1)
[CECOAL, Casilla de Correo 291, 3400 Corrientes, Argentina]

83-000386 Roberts, R. J. A HISTORICAL REVIEW OF MARINE FISH DISEASE STUDIES WITH SPECIAL REFERENCE TO SCOTLAND. *Proc. R. Soc. Edinburgh B Biol. Sci.* 81(3):145-150. 1982. SFA 28(1)
[Inst. Aquacult., Univ. Stirling, Scotland]

83-000387 Wolf, K. and M. E. Markiw. ICHTHYOPHTHIRIASIS: IMMERSION IMMUNIZATION OF RAINBOW TROUT (*SALMO GAIRDNERI*) USEING *TETRAHYMENA THERMOPHILA* AS A PROTECTIVE IMMUNOGEN. *Can. J. Fish. Aquatic Sci.* 39(12):1722-1725. Dec. 1982. In English with French summ. SFA 28(1)
[U.S. FWS, Natl. Fish Health Res. Lab., Box 700, Kearneysville, WV 25430]

BACTERIAL DISEASES

83-000388 Baum, E. T.; E. S. Sawyer and R. G. Strout. SURVIVAL OF HATCHERY-REARED ATLANTIC SALMON SMOLTS VACCINATED WITH A *VIBRIO ANGUILLARUM* BACTERIN. *N. Am. J. Fish. Manage.* 2(4):409-411. 1982. SFA

BACTERIAL DISEASES (CONTINUED)

83-000388 CONTINUED 28(1)
[Me. Atl. Sea-Run Comm., P.O. box 1298, Bangor 04401]

83-000389 Buchanan, D. V.; J. L. Fryer and J. L. Zinn. RELATIVE SUSCEPTIBILITY OF FOUR STOCKS OF SUMMER STEELHEAD (*SALMO GAIRDNERI*) TO INFECTIONS OF CERATOMYXOSIS AND BACTERIAL DISEASES FOUND IN THE WILLAMETTE RIVER. *Oreg. Dep. Fish Wildl. Fish Div. Inf. Rep.* 82-7. 15p. Sept. 1982. SFA 28(1)
[Oreg. Dep. Fish Wildl., 303 Extension Hall, Oreg. State Univ., Corvallis]

83-000390 Bullock, G. L.; G. Maestrone; C. Starliper and B. Schill. POTENTIATED SULFONAMIDE THERAPY OF ENTERIC REDMOUTH DISEASE. *Can. J. Fish. Aquatic Sci.* 40(1):101-102. Jan. 1983. In English with French summ. SFA 28(1)
[U.S. FWS, Natl. Fish. Health Res. Lab., Box 700, Kearneysville, WV 25430]

83-000391 Campbell, A. C. and J. A. Buswell. AN INVESTIGATION INTO THE BACTERIAL AETIOLOGY OF 'BLACK PATCH NECROSIS' IN DOVER SOLE, *SOLEA SOLEA* L. *J. Fish Dis.* 5(6):495-508. Nov. 1982. SFA 28(1)
[J.A. Buswell: Dep. Biol., Paisley Coll. Technol., High Street, Paisley, Renfrewshire PA1 2BE, Scotland]

83-000392 Cipriano, R. C. and C. E. Starliper. IMMERSION AND INJECTION VACCINATION OF SALMONIDS AGAINST FURUNCULOSIS WITH AN AVIRULENT STRAIN OF *AEROMONAS SALMONICIDA*. *Prog. Fish-Cult.* 44(4):167-169. Oct. 1982. SFA 28(1)
[U.S. FWS, Natl. Fish Health Res. Lab., Box 700, Kearneysville, WV 25430]

83-000393 Cone, D. K. A *LACTOBACILLUS* SP. FROM DISEASED FEMALE RAINBOW TROUT, *SALMO GAIRDNERI* RICHARDSON, IN NEWFOUNDLAND, CANADA. *J. Fish Dis.* 5(6):479-485. Nov. 1982. SFA 28(1)
[Dep. Biol., St. Mary's Univ., Halifax, NS B3H 3C3, Canada]

83-000394 Il'inskikh, N. N. and I. P. Il'inskikh. MUTAGENIC PROPERTIES OF THE BACTERIUM *AEROMONAS PUNCTATA* SEPARATED FROM A NATURAL POPULATION OF CRUCIAN CARP, *CARASSIUS CARASSIUS*. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 22(2):151-154. 1982. SFA 28(1)

83-000395 Kent, M. L. CHARACTERISTICS AND IDENTIFICAITON OF *PASTEURELLA* AND *VIBRIO* SPECIES PATHOGENIC TO FISHES USING API-20E (ANALYTAB PRODUCTS) MULTITUBE TEST STRIPS. *Can. J. Fish. Aquatic Sci.* 39(12):1725-1729. Dec. 1982. In English with French summ. SFA 28(1)
[Off. Anim. Resour., M-014, Univ. Calif., La Jolla 92093]

83-000396 Kimura, H. and R. Kusuda. STUDIES ON THE PATHOGENESIS OF STREPTOCOCCAL INFECTION IN CULTURED YELLOWTAILS, *SERIOLA* SPP.: EFFECT OF CRUDE EXOTOXIN FRACTIONS FROM CELL-FREE CULTURE ON EXPERIMENTAL STREPTOCOCCAL INFECTION. *J. Fish Dis.* 5(6):471-478. Nov. 1982. SFA 28(1)
[R. Kusuda: Fish. Dis. Lab., Dep. Cult. Fish., Fac. Agric., Kochi Univ., Nankoku, Jochi Pref., Japan]

BACTERIAL DISEASES (CONTINUED)

83-000397 Munro, A. L. S. FURUNCULOSIS--AN OLD PROBLEM FACING A NEW INDUSTRY. *Proc. R. Soc. Edinburgh B Biol. Sci.* 81(3):177-184. 1982. SFA 28(1)
[Mar. Lab., Victoria Rd., Aberdeen, Scotland] Furunculosis has caused serious economic losses in some Atlantic salmon farms in Scotland. It is considered that the disease has the potential to be a significant economic problem to the whole industry unless control measures are adopted. When salmon in a farmed population carry the disease agent in non-clinical form the bacterium has low to intermediate virulence, but in stocks with recurring clinical disease, virulence is apparently increased. The significance of these observations is discussed in terms of the major methods of control, namely avoidance, husbandry procedures, chemotherapy, vaccines and statutory controls.

83-000398 Santacana, J. A.; D. A. Conroy; M. E. Mujica; C. Marín and N. De López. ACID-FAST BACTERIAL INFECTION AND ITS CONTROL IN THREE-SPOT GOURAMIES, *TRICHOGASTER TRICHOPTERUS* PALLAS. *J. Fish Dis.* 5(6):545-547. Nov. 1982. SFA 28(1)
[D.A. Conroy: Secc. Ictropatol., Fac. Ciencias Vet., Univ. Cent. Venezulea, Apt. Correos 4563, Maracay 2101, Edo. Aragua, Venezulea]

83-000399 Thune, R. L.; T. E. Graham; L. M. Riddle and R. L. Amborski. EXTRACELLULAR PROTEASES FROM *AEROMONAS HYDROPHILA*: PARTIAL PURIFICATION AND EFFECTS ON AGE-0 CHANNEL CATFISH. *Trans. Am. Fish. Soc.* 111(6):749-754. Nov. 1982. SFA 28(1)
[Dep. Vet. Sci., La. State Univ., Baton Rouge 70803]

FUNGAL DISEASES

83-000400 Sohnle, P. G. and M. J. Chusid. DEFENSE AGAINST INFECTION WITH FILAMENTOUS FUNGI IN RAINBOW TROUT. *Comp. Biochem. Physiol. A Comp. Physiol.* 74(1):71-76. 1983. SFA 28(1)
[Dep. Med. Pediatrics, Med. Coll. Wis., Milwaukee 53226]

PROTOZOAN DISEASES

83-000401 Bullock, A. M. and D. A. Robertson. A NOTE ON THE OCCURRENCE OF *ICHTYOBODO NECATOR* (HENNEGUY, 1883) IN A WILD POPUALTION OF JUVENILE PLAICE, *PLEURONECTES PLATESSA* L. *J. Fish Dis.* 5(6):531-533. Nov. 1982. SFA 28(1)
[Dunstaffnage Mar. Res. Lab., P.O. Box 3, Oban, Argyll, PA34 4AD, Scotland]

83-000402 Copland, J. W. *MYXOBOLUS DERMATOBIA* (ISHII, 1915) INFECTION OF WILD EELS, *ANGUILLA ANGUILLA* L., IN ENGLAND. *J. Fish Dis.* 5(6):549-552. Nov. 1982. SFA 28(1)
[Reg. Vet. Lab., Box 388, Benalla, Victoria 3672, Australia]

83-000403 Dyková, I. and J. Lom. *SPHAEROSPORA RENICOLA* N.SP., A MYXOSPOREAN FROM CARP KIDNEY, AND ITS PATHOGENICITY. *Z. Parasitenkd.* 68(3):259-268. Dec. 1982. SFA 28(1)
[Inst. Parasitol., Czech. Acad. Sci., Flemingovo n. 2, 16632 Prague 6, Czechoslovakia]

PROTOZOAN DISEASES (CONTINUED)

83-000404 Molnár, K. NODULAR COCCIDIOSIS IN THE GUT OF THE TENCH, *TINCA TINCA* L. *J. Fish Dis.* 5(6):461-470. Nov. 1982. SFA 28(1)
[Vet. Med. Res. Inst., Hungarian Acad. Sci., H-1581 Budapest, P.O. Box 18, Hungary]

83-000405 Molnar, K. BIOLOGY AND HISTOPATHOLOGY OF *THELOHANELLUS NIKOLSKII* ACHMEROV, 1955 (MYXOSPOREA, MYXOZOA), A PROTOZOAN PARASITE OF THE COMMON CARP (*CYPRINUS CARPIO*). *Z. Parasitenkd.* 68(3):269-277. Dec. 1982. SFA 28(1)
[Vet. Med. Res. Inst., Hungarian Acad. Sci., 1143 Budapest, Hungária krt. 21, Hungary]

83-000406 Paperna, I. *KUDOA* INFECTION IN THE GLOMERULI, MESENTERY AND PERITONEUM OF CULTURED *SPARUS AURATA* L. *J. Fish Dis.* 5(6):539-543. Nov. 1982. SFA 28(1)
[H. Steinitz Mar. Biol. Lab., Hebrew Univ. Jerusalem, P.O. Box 469, Eilat, Israel]

83-000407 Price, R. L. INCIDENCE OF *PLEISTOPHORA CEPEDIANAE* (MICROSPORIDA) IN GIZZARD SHAD (*DOROSOMA CEPEDIANUM*) OF CARLYLE LAKE, ILLINOIS. *J. Parasitol.* 68(6):1167-1168. Dec. 1982. SFA 28(1)
[Dep. Zool., South. Ill. Univ., Carbondale 62901]

83-000408 Pulsford, A. and R. A. Matthews. AN ULTRASTRUCTURAL STUDY OF *MYXOBOLUS EXIGUUS* THELOHAN, 1895 (MYXOSPOREA) FROM GREY MULLET, *CRENIMUGIL LABROSUS* (RISSO). *J. Fish Dis.* 5(6):509-526. Nov. 1982. SFA 28(1)
[Mar. Biol. Assoc. U.K., The Laboratory, Citadel Hill, Plymouth PL1 2PB, England]

VIRAL DISEASES

83-000409 Ahne, W.; H. Mahnel and P. Steinhagen. ISOLATION OF PIKE FRY RHABDOVIRUS FROM TENCH, *TINCA TINCA* L., AND WHITE BREAM, *BLICCA BJOERKNA* (L.). *J. Fish Dis.* 5(6):535-537. Nov. 1982. SFA 28(1)
[Inst. Zool. Hydrobiol., Univ. München, 8 München 22, Kaulbackstr. 37, West Germany]

83-000410 Buchanan, J. S. and R. H. Richards. HERPES-TYPE VIRUS DISEASES OF MARINE ORGANISMS. *Proc. R. Soc. Edinburgh B Biol. Sci.* 81(3):151-168. 1982. SFA 28(1)
[Napier Coll. Comm. Technol., Colinton Rd., Edinburgh, Scotland] Herpesviruses and viruses having the typical morphological and replicative characteristics of the genus *Herpesvirus* from marine animals have been reviewed. These animals include one teleost fish, two reptiles, one pelecypod mollusc and an arthropod. With the exception of the arthropod, all descriptions of virus-related diseases were from animals maintained under artificial culture conditions and a common theme relates temperature, stress and crowding to outbreaks of disease. The significance of these observations in relation to the possible evolution of the herpesvirus group is discussed.

83-000411 Holloway, H. L., Jr. and C. E. Smith. A MYOPATHY IN NORTH DAKOTA WALLEYE, *STIZOSTEDION VITREUM* (MITCHILL). *J. Fish Dis.* 5(6):527-530. Nov. 1982. SFA 28(1)

VIRAL DISEASES (CONTINUED)

83-000411 CONTINUED
[Dep. Biol., Univ. N. Dak., Box 8238, University Station, Grand Forks 58202]

83-000412 Ratliff, D. E.; R. L. Hill and W. J. Groberg, Jr. INFECTIOUS HEMATOPOIETIC NECROSIS: A COMPARISON OF EPIZOOTICS AMONG FRY HATCHED FROM SALINE-RINSED AND UNRINSED STEELHEAD EGGS. *Prog. Fish-Cult.* 44(4):217-220. Oct. 1982. SFA 28(1)
[Portland General Electric Company, Dep. Environ. Sci., Madras, OR 97741]

83-000413 Silim, A.; M. A. S. Y. Elazhary and A. Lagacé. SUSCEPTIBILITY OF TROUTS OF DIFFERENT SPECIES AND ORIGINS TO VARIOUS ISOLATES OF INFECTIOUS PANCREATIC NECROSIS VIRUS. *Can. J. Fish. Aquatic Sci.* 39(12):1580-1584. Dec. 1982. In English with French summ. SFA 28(1)
[Dep. Pathol. Microbiol., Fac. Vet. Med., Univ. Montreal, P.O. Box 5000, Saint-Hyacinthe, PQ J2S 7C6, Canada]

83-000414 Small, D. A. VIRAL ERYTHROCYTIC NECROSIS IN FISH: A REVIEW. *Proc. R. Sco. Edinburgh B Biol. Sci.* 81(3):169-176. 1982. SFA 28(1)
[D.A.F.S. Mar. Lab., Victoria Rd., Aberdeen AB9 8DB, Scotland] Viral erythrocytic necrosis (VEN) in fish is prevalent in a wide variety of fish species. It has been detected in both wild and captive fish populations. The infection prevalence in wild populations of some fish species is correlated inversely with the age of the fish. VEN is characterised by cytoplasmic inclusions in circulating erythrocytes of infected fish; nuclear necrosis of erythrocytes may also be evident by light microscopy. The stage and degree of infection affect the type of cytology seen in VEN infections of different fish species. By electron microscopy, infected erythrocytes show spherical virions within the cytoplasm and the virion size is characteristic of the host erythrocytes infected. To date, knowledge of VEN viruses in fish is restricted to virus morphology and propagation *in vivo*, although preliminary studies have indicated the type of blood parameters which VEN can affect. No such virus has been fully isolated and characterised and all of Koch's postulates have not been fulfilled.

83-000415 Swanson, R. N.; J. C. Carlisle and J. H. Gillespie. PATHOGENESIS OF INFECTIOUS PANCREATIC NECROSIS VIRUS INFECTION IN BROOK TROUT, *SALVELINUS FONTINALIS* (MITCHILL), FOLLOWING INTRAPERITONEAL INJECTION. *J. Fish. Dis.* 5(6):449-460, Nov. 1982. SFA 28(1)
[Dep. Microbiol., Uniformed Serv. Univ. Health Sci., Bethesda, MD 20814]

OTHER DISEASES AND PARASITES

83-000416 Brown, L. A. SURGICAL GONADECTOMY OF SALMONID FISH AND SUBSEQUENT PREVENTION OF DISEASES ASSOCIATED WITH SEXUAL MATURATION. *Proc. R. Soc. Edinburgh B Biol. Sci.* 81(3):211-219. 1982. SFA 28(1)
[Inst. Aquacult., Univ. Stirling, Scotland]

83-000417 Bullock, A. M. THE PATHOLOGICAL EFFECTS OF ULTRAVIOLET RADIATION ON THE EPIDERMIS OF TELEOST FISH WITH REFERENCE TO THE SOLAR RADIATION EFFECT IN HIGHER ANIMALS. *Proc. R. Soc. Edinburgh B Biol. Sci.* 81(3):199-210.

OTHER DISEASES AND PARASITES (CONTINUED)

83-000417 CONTINUED 1982. SFA 28(1)
[Dunstaffnage Mar. Res. Lab., Oban, Argyll, Scotland] The general epidermal morphology of teleost fish is described and comparison made in terms of its vulnerability to ultraviolet radiation (UVR) with that of the human. Whereas human skin has a natural pigmentary photoprotective (tanning) mechanism within it epidermis, in teleosts the protective pigment layer is located primarily within the upper dermis. The potential impact of solar UV on farmed fish is discussed both in relation to water penetration of UVR and the phenomenon of photosensitisation, a condition common in higher animals and which has now been shown to induce skin lesions in fish. The results of recent investigations into photosensitisation in fish are described.

83-000418 Christensen, B. M. and R. L. Calentine. *PENARCHIGETES MACRORCHIS* SP. N. (CESTOIDEA: CARYOPHYLLAEIDAE) FROM THE LAKE CHUBSUCKER, *ERIMYZON SUCETTA* (LACÉPÈDE), IN WESTERN KENTUCKY. *Proc. Helminthol. Soc. Wash.* 50(1):112-116. Jan. 1983. SFA 28(1)
[Dep. Biol. Sci., Murray State Univ., Murray, KY 42071]

83-000419 Deardorff, T. L.; M. M. Kliks; M. E. Rosenfeld; R. A. Rychlinski and R. S. Desowitz. LARVAL ASCARIDOID NEMATODES FROM FISHES NEAR THE HAWAIIAN ISLANDS, WITH COMMENTS ON PATHOGENICITY EXPERIMENTS. *Pac. Sci.* 36(2):187-201. Apr. 1982. SFA 28(1)
[Univ. Hawaii, Leahi Hosp., 3675 Kilauea Ave., Honolulu 96816]

83-000420 Fagerholm, H.-P.; K. Kuusela and E. T. Valtonen. ON THE OCCURRENCE OF *CYSTIDICOLOIDES EPHEMERIDARUM* (NEMATODA: SPIRUROIDEA) IN GRAYLING (*THYMALLUS THYMALLUS*) IN THE OULANKA AND KITKAJOKI RIVERS (KUUSAMO, FINLAND). *Mem. Soc. Fauna Flora Fenn.* 58(3):67-70. 1982. SFA 28(1)
[Inst. Parasitol., Åbo Akad., SF-20500 Åbo 50, Finland]

83-000421 Fischthal, J. H.; D. O. Carson and R. S. Vaught. SIZE ALLOMETRY OF THE CARYOPHYLLIDEAN CESTODE *GLARIDACRIS LARUEI* FROM THE WHITE SUCKER. *J. Parasitol.* 68(6):1175-1177. Dec. 1982. SFA 28(1)
[Dep. Biol. Sci., State Univ. N.Y., Binghampton 13901]

83-000422 George-Nascimento F., M. and L. Vergara R. RELATIONSHIPS BETWEEN SOME INHERENT HOST FACTORS AND THE SIZE OF INFRAPOPULATIONS OF *PROLEPTUS ACUTUS* DUJARDIN, 1845 (NEMATODA: SPIRURIDA) WITHIN THE STOMACH OF ITS DEFINITIVE HOST, *SCHROEDERICHTHYS CHILENSIS* (GUICHENOT, 1848) (CHONDRICHTHYES: SCYLIORHINIDAE). *J. Parasitol.* 68(6):1170-1172. Dec. 1982. SFA 28(1)
[Dep. Biol. Tecnol. del Mar, Pontifica Univ. Catol. Chile, Sede Talcahuano, Casilla 127-Talcahuano, Chile]

83-000423 Ho, J. COPEPOD PARASITES OF *PSYCHROLUTES* (PISCES: SCORPAENIFORMES) FROM DEEP WATER IN THE EASTERN PACIFIC. *Parasitology* 85(3):451-458. Dec. 1982. SFA 28(1)
[Dep. Biol., Calif. State Univ., Long Beach 90840]

83-000424 Jarling, C. ON THE HELMINTH FAUNA OF THE SMELT (*OSMERUS EPERLANUS* L.) IN THE ELBE ESTUARY. *Arch. Hydrobiol. Supplementb.* 61(3):377-395. 1982. SFA 28(1)
[Zool. Inst. Mus., Univ. Hamburg, West Germany]

OTHER DISEASES AND PARASITES (CONTINUED)

83-000425 Kazacos, K. R. and G. O. Appel. *EUCLINOSTOMUM HETEROSTOMUM* METACERCARIAE (TREMATODA: CLINOSTOMATIDAE) FROM THE AQUARIUM RAM, *APISTOGRAMMA RAMIREZI* (PISCES: CICHLIDAE). *Proc. Helminthol. Soc. Wash.* 50(1):103-107. Jan. 1983. SFA 28(1)
[Dep. Vet. Microbiol., Purdue Univ., West Lafayette, IN 47907]

83-000426 Nair, G. A. and N. B. Nair. EFFECT OF INFESTATION WITH THE ISOPOD, *ALITROPUS TYPUS* M. EDWARDS (CRUSTACEA: FLABELLIFERA: AEGIDAE) ON THE HAEMATOLOGICAL PARAMETERS OF THE HOST FISH, *CHANNA STRIATUS* (BLOCH). *Aquaculture* 30(1-4):11-19. Jan. 1983. SFA 28(1)
[Dep. Aquatic Biol. Fish., Univ. Kerala, Beach P.O., Trivandrum - 695007 India]

83-000427 Robotham, P. W. J. and J. S. Thomas. INFECTION OF THE SPINED LOACH, *COBITIS TAENIA* (L.), BY THE DIGENEAN, *ALLOCREADIUM TRANSVERSALE (RUD.). J. Fish Biol.* 21(6):699-703. Dec. 1982. SFA 28(1)
[Div. Biol., Derby Lonsdale Coll., Kedleston Rd., Derby, U.K.]

83-000428 Scott, J. S. DIGENEAN PARASITE COMMUNITIES IN FLATFISHES OF THE SCOTIAN SHELF AND SOUTHERN GULF OF ST. LAWRENCE. *Can. J. Zool.* 60(11):2804-2811. Nov. 1982. In English with French summ. SFA 28(1)
[Mar. Fish. Div., Dep. Fish. Oceans, Biol. Stn., St. Andrews, NB E0G 2X0, Canada]

83-000429 Skinner, R. H. THE INTERRELATION OF WATER QUALITY, GILL PARASITES, AND GILL PATHOLOGY OF SOME FISHES FROM SOUTH BISCAYNE BAY, FLORIDA. *NOAA Fish. Bull.* 80(2):269-280. Apr. 1982. SFA 28(1)
[3834 El Prado Blvd., Miami, FL 33133]

83-000430 Vala, J. C.; C. Maillard, and R. M. Overstreet. *HALIOTREMA* (MONOGENEA: ANCYROCEPHALINAE) FROM OSTRACIID FISHES IN GUADELOUPE, WEST INDIES. *J. Parasitol.* 68(6):1130-1137. Dec. 1982. SFA 28(1)
[Fac. Sci., 33 Rue Louis Pasteur, 84000 Avignon, France]

83-000431 Widlak, J. and R. J. Neves. INCIDENCE OF GLOCHIDIAL INFECTIONS ON FISHES IN THE NORTH FORK HOLSTON RIVER, VIRGINIA. *Va. J. Sci.* 33(3):122. 1982. Abstract only. SFA 28(1)
[Dep. Fish. Wildl. Sci., VPI&SU, Blacksburg, VA 24061]

83-000432 Williams, E. H., Jr. NEW HOST RECORDS FOR SOME NEMATODE PARASITES OF FISHES FROM ALABAMA AND ADJACENT WATERS. *Proc. Helminthol. Soc. Wash.* 50(1):178-182. Jan. 1983. SFA 28(1)
[Dep. Mar. Sci., Univ. Puerto Rico, Mayaguez 00708]

83-000433 Wootten, R.; J. W. Smith and E. A. Needham. ASPECTS OF THE BIOLOGY OF THE PARASITIC COPEPODS *LEPEOPHTHEIRUS SALMONIS* AND *CALIGUS ELONGATUS* ON FARMED SALMONIDS, AND THEIR TREATMENT. *Proc. R. Soc. Edinburgh B Biol. Sci.* 81(3):185-197. 1982. SFA 28(1)
[D.A.F.S. Mar. Lab., Victoria Rd., Aberdeen AB9 8DB, Scotland]

POLLUTION

83-000434 Baudo, R.; G. Galanti; B. Locht; H. Muntau and P. G. Varini. HEAVY METAL CONCENTRATONS OF PIKE (*ESOX LUCIUS*) AND FOUR OTHER FISH SPECIES FROM THE PALLANZA BASIN (LAGO MAGGIORE). *Mem. Ist. Ital. Idrobiol. Dott. Marco de Marchi* 38:409-414. 1981. SFA 28(1)
[Ist. Ital. Idrobiol., 28048 Pallanza, Italy]

83-000435 Bisson, P. A. and R. E. Bilby. AVOIDANCE OF SUSPENDED SEDIMENT BY JUVENILE COHO SALMON. *N. Am. J. Fish. Manage.* 2(4):371-374. 1982. SFA 28(1)
[Weyerhaeuser Co., Technol. Cent., Tacoma, WA 98477]

83-000436 Confer, J. L.; T. Kaaret and G. E. Likens. ZOOPLANKTON DIVERSITY AND BIOMASS IN RECENTLY ACIDIFIED LAKES. *Can. J. Fish. Aquatic Sci.* 40(1):36-42. Jan. 1983. In English with French summ. SFA 28(1)
[Biol. Dep., Ithaca Coll., Ithaca, NY 14853]

83-000437 Evans, R. D. and D. C. Lasenby. RELATIONSHIP BETWEEN BODY-LEAD CONCENTRATION OF *MYSIS RELICTA* AND SEDIMENT-LEAD CONCENTRATION IN KOOTENAY LAKE, B.C. *Can. J. Fish. Aquatic Sci.* 40(1):78-81. Jan. 1983. In English with French summ. SFA 28(1)
[Watershed Ecosyst. Prog., Trent Univ., Peterborough, ON K9J 7B8, Canada]

83-000438 Fallis, B. W.; W. E. Klenner and D. W. Kroeker. BIBLIOGRAPHY OF TRACE METALS (As, Cd, Hg, Pb, Zn) IN MARINE ECOSYSTEMS WITH EMPHASIS ON ARCTIC REGIONS; 1970 TO 1980. *Can. Tech. Rep. Fish. Aquatic Sci.* No. 1087. iv + 33p. July 1982. In English with French summ. SFA 28(1)
[Dep. Fish. Oceans, Winnipeg, MB R3T 2N6, Canada]

83-000439 Hall, L. W., Jr.; D. T. Burton; S. L. Margrey and W. C. Graves. A COMPARISON OF THE AVOIDANCE RESPONSES OF INDIVIDUAL AND SCHOOLING JUVENILE ATLANTIC MENHADEN, *BREVOORTIA TYRANNUS* SUBJECTED TO SIMULTANEOUS CHLORINE AT ΔT CONDITIONS. *J. Toxicol. Environ. Health* 10(6):1017-1026. Dec. 1982. SFA 28(1)
[Johns Hopkins Univ., Appl. Phys. Lab., Aquatic Ecol. Sect., Shady Side, MD 20764]

83-000440 Hilsenhoff, W. L. USING A BIOTIC INDEX TO EVALUATE WATER QUALITY IN STREAMS. *Wis. Dep. Nat. Resour. Tech. Bull.* No. 132. 22p. 1982. SFA 28(1)
[Dep. Entomol., Univ. Wis., Madison]

83-000441 Howells, G. and T. A. Haines. INTERPRETATION OF AQUATIC pH TRENDS. *Trans. Am. Fish. Soc.* 111(6):779-786. Nov. 1982. SFA 28(1)
[Cent. Elec. Res. Lab., Technol. Plan. Res. Div., Leatherhead, Surrey KT22 75E, England]

83-000442 Locht, B.; H. Muntau; R. Baudo; G. Galanti and P. G. Varini. DETECTION OF CRITICAL MERCURY CONCENTRATIONS IN EDIBLE FISH FROM PALLANZA BASIN, LAGO MAGGIORE. *Mem. Ist. Ital. Idrobiol. Dott. Marco de Marchi* 38:415-422. 1981. SFA 28(1)
[Comm. Eur. Commun. Joint Res. Cent., Ispra Establishment, Italy]

POLLUTION (CONTINUED)

83-000443 MacLean, N. G.; G. C. Teleki and J. Polak. ULTRASONIC TELEMETRY STUDIES OF FISH ACTIVITY NEAR THE NANTICOKE THERMAL GENERATING STATION. *J. Great Lakes Res.* 8(3):495-504. 1982. SFA 28(1)
[Nanticoke Fish Study, Ontario Minist. Nat. Resour., P.O. Box 429, Port Dover, ON N0A 1N0, Canada] Nanticoke is a developing industrial centre on the north shore of Lake Erie on Long Point Bay. Ultrasonic telemetry studies were conducted in 1973-77 to determine the effects of Nanticoke Thermal Generating Station's warmwater discharge on movement patterns of smallmouth bass (*Micropterus dolomieui*), rock bass (*Ambloplites rupestris*), and yellow perch (*Perca flavescens*). A total of 74 fish were tracked in the station's effluent plume and at control locations. These fish were monitored continuously, recording position, distance between turns, swim speed and angle of course alteration, as well as various environmental parameters. An activity index was developed to measure the overall level of fish activity. The measured activity of all three species was significantly lower within the plume than outside of it. Water depth appeared to be the most important factor determining fish activity, followed by wave height, current speed, and temperature. Wave height, current speed, and temperature are directly affected by the thermal discharge. However, upon closer examination, the response to the plume appeared to have been principally rheotactic. No long-term residency in the plume was observed during this study or during concurrent mark-recapture studies.

83-000444 Monod, G. and G. Keck. PCBs IN LAKE GENEVA (LAKE LEMAN) FISH. *Bull. Environ. Contam. Toxicol.* 29(5):570-576. Nov. 1982. SFA 28(1)
[Lab. Toxicol., Marcy l'Etoile, 69260 Charbonnieres les Bains, France]

83-000445 Ney, J. J.; M. G. Martin and J. M. Mudre. PATTERNS OF BIOACCUMULATION OF HEAVY METALS IN STREAM FISHES. *Va. J. Sci.* 33(3):116. 1982. Abstract only. SFA 28(1)
[Dep. Fish. Wildl. Sci., VPI&SU, Blacksburg, VA 24061]

83-000446 Rahel, F. J. and J. J. Magnuson. LOW pH AND THE ABSENCE OF FISH SPECIES IN NATURALLY ACIDIC WISCONSIN LAKES: INFERENCES FOR CULTURAL ACIDIFICATION. *Can. J. Fish. Aquatic Sci.* 40(1):3-9. Jan. 1983. In English with French summ. SFA 28(1)
[Lab. Limnol., Univ. Wis., Madison 53706]

83-000447 Ramamoorthy, S.; T. C. Cheng and D. J. Kushner. MERCURY SPECIATION IN WATER. *Can. J. Fish. Aquatic Sci.* 40(1):85-89. Jan. 1983. In English with French summ. SFA 28(1)
[Anim. Sci. Wing, Alberta Environ. Cent., Bag 4000, Vegreville, AB T0B 4L0, Canada]

83-000448 Roch, M.; J. A. McCarter; A. T. Matheson; M. J. R. Clark and R. W. Olafson. HEPATIC METALLOTHIONEIN IN RAINBOW TROUT (*SALMO GAIRDNERI*) AS AN INDICATOR OF METAL POLLUTION IN THE CAMPBELL RIVER SYSTEM. *Can. J. Fish. Aquatic Sci.* 39(12):1596-1601. Dec. 1982. In English with French summ. SFA 28(1)
[Dep. Biochem. Microbiol., Univ. Victoria, Victoria, BC V8W 2Y2, Canada]

TOXICOLOGY; BIOASSAYS

83-000449 Alexander, H. C.; J. A. Quick, Jr.; R. J. Moolenaar; E. A. Bartlett; C. G. Mendoza and G. U. Boggs. DYNAMICS OF BROMIDE UPTAKE AND DEPURATION BY FATHEAD MINNOWS. *Trans. Am. Fish. Soc.* 111(6):755-760. Nov.

TOXICOLOGY; BIOASSAYS (CONTINUED)

83-000449 CONTINUED 1982. SFA 28(1)
[Environ. Sci. Res. Lab., Div. Chemical U.S.A., Midland, MI 48640]

83-000450 Cairns, M. A. and A. V. Nebeker. TOXICITY OF ACENAPHTHENE AND ISOPHORONE TO EARLY LIFE STAGES OF FATHEAD MINNOWS. *Arch. Environ. Contam. Toxicol.* 11(6):703-707. Nov. 1982. SFA 28(1)
[U.S. EPA, Corvallis Environ. Res. Lab., 200 S.W. 35th St., Corvallis, OR 97333] Flow-through 96-hr and early-life-stage toxicity tests were conducted with acenaphthene and isophorone, using fathead minnows (*Pimephales promelas*) as test animals. The 96-hr LC_{50}'s were 608 µg/L for acenaphthene and 145 and 255 mg/L for isophorone, depending on fish age. No-effect concentrations from early-life-stage exposures were 413 µg acenaphthene/L and 14 mg isophorone/L; these showed good agreement with published toxicity data.

83-000451 Davis, K. B.; N. C. Parker and M. A. Suttle. PLASMA CORTICOSTEROIDS AND CHLORIDES IN STRIPED BASS EXPOSED TO TRICAINE METHANESULFONATE, QUINALDINE, ETOMIDATE, AND SALT. *Prog. Fish-Cult.* 44(4):205-207. Oct. 1982. SFA 28(1)
[Dep. Biol., Memphis State Univ., Memphis, TN 38152]

83-000452 Dawson, M. A. EFFECTS OF LONG-TERM MERCURY EXPOSURE ON HEMATOLOGY OF STRIPED BASS, *MORONE SAXATILIS*. *NOAA Fish. Bull.* 80(2):389-392. Apr. 1982. SFA 28(1)
[NMFS, Milford, CT 06460-6499]

83-000453 Eddy, F. B. and J. E. Fraser. SIALIC ACID AND MUCUS PRODUCTION IN RAINBOW TROUT (*SALMO GAIRDNERI* RICHARDSON) IN RESPONSE TO ZINC AND SEAWATER. *Comp. Biochem. Physiol. C Comp. Pharmacol.* 73(2):357-359. 1982. SFA 28(1)
[Dep. Biol. Sci., The University, Dundee DD1 4HN, Scotland]

83-000454 Fabacher, D. L. HEPATIC MICROSOMES FROM FRESHWATER FISH--II. REDUCTION OF BENZO(A)PYRENE METABOLISM BY THE FISH ANESTHETICS QUINALDINE SULFATE AND TRICAINE. *Comp. Biochem. Physiol. C Comp. Pharmacol.* 73(2):285-288. 1982. SFA 28(1)
[U.S. FWS, Columbia Natl. Fish. Res. Lab., Rt. 1, Columbia, MO 65201]

83-000455 Fletcher, G. L.; M. J. King; J. W. Kiceniuk and R. F. Addison. LIVER HYPERTROPHY IN WINTER FLOUNDER FOLLOWING EXPOSURE TO EXPERIMENTALLY OILED SEDIMENTS. *Comp. Biochem. Physiol. C Comp. Pharmacol.* 73(2):457-462. 1982. SFA 28(1)
[Mar. Sci. Res. Lab., Memorial Univ. Newfoundland, St. John's, NF, Canada]

83-000456 Foureman, G. L. THE METABOLISM OF POLYCYCLIC AROMATIC HYDROCARBONS BY TWO MARINE FISHES: THE LITTLE SKATE, *RAJA ERINACEA* AND THE WINTER FLOUNDER, *PSEUDOPLEURONECTES AMERICANUS*. *Ph.D. dissertation, N.C. State Univ.* 169p. 1982. From Diss. Abstr. Int. B Sci. Eng. 43(6):1705. Dec. 1982. SFA 28(1)

TOXICOLOGY; BIOASSAYS (CONTINUED)

83-000457 Hall, L. W., Jr.; W. C. Graves; D. T. Burton; S. L. Margrey; F. M. Hetrick and B. S. Roberson. A COMPARISON OF CHLORINE TOXICITY OF THREE LIFE STAGES OF STRIPED BASS (*MORONE SAXATILIS*). *Bull. Environ. Contam. Toxicol.* 29(6):631-636. Dec. 1982. SFA 28(1)
[Johns Hopkins Univ., Appl. Phys. Lab., Aquatic Ecol. Sect., Shady Side, MD 20764]

83-000458 Hannah, J. B.; J. E. Hose; M. L. Landolt; B. S. Miller; S. P. Felton and W. T. Iwaoka. BENZO(A)PYRENE-INDUCED MORPHOLOGIC AND DEVELOPMENTAL ABNORMALITIES IN RAINBOW TROUT. *Arch. Environ. Contam. Toxicol.* 11(6):727-734. Nov. 1982. SFA 28(1)
[J. E. Hose: Dep. Biol., Occidental Coll., 1600 Campus Rd., Los Angeles, CA 90041]

83-000459 Hiltibran, R. C. EFFECTS OF INSECTICIDES ON THE METAL-ACTIVATED HYDROLYSIS OF ADENOSINE TRIPHOSPHATE BY BLUEGILL LIVER MITOCHONDRIA. *Arch. Environ. Contam. Toxicol.* 11(6):709-717. Nov. 1982. SFA 28(1)
[Ill. Inst. Nat. Resour., State Nat. Hist. Surv. Div., Nat. Resour. Bldg., 607 E. Peabody, Champaign, IL 61820] Investigations were made on the effects of the pesticides aldrin, carbofuran, chlordane, DDE, Dasanit, diazinon, dieldrin, endrin, heptachlor, Kepone, lindane, malathion, methoxychlor, parathion, Thimet, Sevin, and toxaphene on the metal-ion-activated hydrolysis of adenosine triphosphate (ATP) by bluegill (*Lepomis macrochirus* Raf.) liver mitochondria. Chlordane, dieldrin, heptachlor, Kepone, lindane, methoxychlor, and toxaphene decreased the activities of Cd^{2+} and Zn^{2+} ATPases. Aldrin decreased Zn^{2+} ATPase but did not alter Cd^{2+} ATPase. The effects of endrin, diazinon, malathion, carbaryl, Thimet, Dasanit, and carbofuran on Cd^{2+} and Zn^{2+} ATPases were not investigated. DDE, dieldrin, lindane, parathion, and Thimet increased Mn^{2+} ATPase activity, whereas aldrin, heptachlor, and Kepone reduced Mn^{2+} ATPase activity. Dieldrin, lindane, toxaphen, diazinon, and parathion increased, whereas aldrin, endrin, heptachlor, Kepone, carbofuran, and Sevin decreased Mg^{2+} ATPase activity. DDE, toxaphene, diazinon, malathion, and parathion increased, but chlordane and endrin reduced Ca^{2+} ATPase activity.

83-000460 Johnson, B. T., (ed.). IMPACT OF XENOBIOTIC CHEMICALS ON MICROBIAL ECOSYSTEMS. *U.S. Fish Wildl. Serv. Tech. Pap.* 107. 36p. 1982. SFA 28(1)
[U.S. FWS, Columbia Natl. Fish. Res. Lab., Columbia, MO 65201]

83-000461 Julshamn, K.; O. Ringdal and O. R. Braekkan. MERCURY CONCENTRATION IN LIVER AND MUSCLE OF COD (*GADUS MORHUA*) AS AN EVIDENCE OF MIGRATION BETWEEN WATERS WITH DIFFERENT LEVELS OF MERCURY. *Bull. Environ. Contam. Toxicol.* 29(5):544-549. Nov. 1982. SFA 28(1)
[Inst. Vitamin Res., Dir. Fish., P.O. Box 4285, N-5013 Nygardstangen, Bergen, Norway]

83-000462 Khangarot, B. S. and V. S. Durve. NOTE ON THE ACUTE TOXICITY OF ZINC, AND THE INTERACTIONS OF ZINC AND NICKEL TO A FRESHWATER TELEOST *CHANNA PUNCTATUS* (BLOCH). *Indian J. Anim. Sci.* 52(8):722-735. Aug. 1982. SFA 28(1)
[Post-Grad. Dep. Zool., Bhupal Nobles' Coll., Udaipur, Rajasthan 313 001, India]

83-000463 Kimura, L. H.; M. A. Abad and Y. Hokama. EVALUATION OF THE RADIOIMMUNOASSAY (RIA) FOR DETECTION OF CIGUATOXIN (CTX) IN FISH TISSUES. *J. Fish Biol.* 21(6):671-680. Dec. 1982. SFA 28(1)

TOXICOLOGY; BIOASSAYS (CONTINUED)

83-000463 CONTINUED
[Dep. Pathol., John A. Burns Sch. Med., Univ. Hawaii Manoa, Honolulu 96822]

83-000464 Kostrov. B. P. EFFECT OF ^{32}P AND MERCURIC CHLORIDE ON THE EMBRYONIC DEVELOPMENT OF LOACH, *MISGURNUS FOSSILIS*. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 21(6):167-169. 1981. SFA 28(1)
[Dagestan Div., Caspian Fish. Res. Inst., Makhachkala, USSR]

83-000465 Martoja, R.; M. Truchet and J. Bouquegneau. UNE NÉPHROPATHIE PROVOQUÉE PAR LE CADMIUM CHEZ L'ANGUILLE ADAPTÉE À L'EAU DE MER (TÉLÉOSTÉEN). [NEPHROPATHIC CASTS IN THE KIDNEYS OF EELS EXPOSED TO CADMIUM.] *C.R. Hebd. Seances Acad. Sci. Ser. III Sci. Vie* 295(5):369-374. 11 Oct. 1982. In French with English Summ. SFA 28(1)
[Lab. Histophysiol. Fond. Appl., E.R.A. No. 570, C.N.R.S., 12, rue Cuvier, 75005 Paris, France]

83-000466 Nieminen, M.; M. Laitinen and P. Pasanen. EFFECTS OF ANAESTHESIA WITH TRICAINE (MS 222) ON THE BLOOD COMPOSITION OF THE SPLAKE (*SALVELINUS FONTINALIS* X *SALVELINUS NAMAYCUSH*). *Comp. Biochem. Physiol. C Comp. Pharmacol.* 73(2):271-276. 1982. SFA 28(1)
[Finnish Game Fish. Res. Inst., Game Div., 96100 Rovaniemi 10, Finland]

83-000467 Pickering, Q. H. and W. T. Gilliam. TOXICITY OF ALDICARB AND FONOFOS TO THE EARLY-LIFE-STAGE OF THE FATHEAD MINNOW. *Arch. Environ. Contam. Toxicol.* 11(6):699-702. Nov. 1982. SFA 28(1)
[U.S. EPA, Newtown Fish Toxicol. Stn., Cincinnati, OH 45244] Flow-through early-life-stage (ELS) toxicity tests were conducted with the pesticides aldicarb (Temik) and fonofos (Dyfonate) to determine their effect on the survival and growth of fathead minnows. Concentrations of 78 µg/L of aldicarb and 16 µg/L of fonofos did not affect survival and growth. However, 156 µg/L of aldicarb and 33 µg/L of fonofos were lethal to larval-juvenile exposed for 30 days post-hatch. The maximum acceptable toxicant concentration (MATC) of aldicarb and fonofos for the fathead minnow is estimated to be between 78-156 µg/L and 16-33 µg/L, respectively. The corresponding chronic values (geometric mean of MATC values) would be 110 µg/L and 23 µg/L. Acute toxicity tests gave 96-hr LC50 values of 1370 µg aldicarb/L and 1090 µg fonofos/L. The acute-chronic ratio (96-hr LC50/chronic value) is 12 for aldicarb and 47 for fonofos.

83-000468 Richardson, L. B.; D. T. Burton; R. M. Block and A. M. Stavola. LETHAL AND SUBLETHAL EXPOSURE AND RECOVERY EFFECTS OF OZONE-PRODUCED OXIDANTS ON ADULT WHITE PERCH (*MORONE AMERICANA* GMELIN). *Water Res.* 17(2):205-213. 1983. SFA 28(1)
[Acad. Nat. Sci. Phila., Benedict Estuarine Res. Lab., Benedict, MD 20612] Adult white perch (*Morone americana*), acclimated to 15°C, were exposed to a series of ozone-produced oxidant (OPO) concentrations for 96h using continuous flow bioassay techniques. Toxicity data were analyzed using both response surface modeling and standard probit regression. Whiteperch were also exposed to a series of near and sublethal OPO concentrations, selected from the acute toxicity study, for 96h and then placed in clean non-ozonated water for 14 days. Blood pH, hematocrit and gill histopathology were

TOXICOLOGY; BIOASSAYS (CONTINUED)

83-000468 CONTINUED analyzed during exposure at 24, 48 and 96h and after 4 and 14 days in the multiple range tests. Histopathological effects were examined using both light microscopy and scanning electron microscopy. The 24-, 48- and 96-h LC_{50}'s were 0.38, 0.26 and 0.20 mg OPO l^{-1}, respectively. Blood pH was significantly reduced at concentrations ≥15 mg OPO l^{-1} but not at ≥0.10 mg l^{-1} or lower concentrations. Hematocrit significantly increased at concentrations ≥0.10 mg OPO l^{-1}. Histopathological examination revealed minimal effects on gill tissue at 0.01 mg OPO l^{-1}, moderate epithelial sloughing and heavy mucus production at 0.05 mg OPO l^{-1} and extreme tissue damage at concentrations ≥0.10 mg l^{-1}. Results from both the acute toxicity and the exposure and recovery study were compared with the effects of chlorine-produced oxidants (CPO) obtained from the literature. Both OPO and CPO appear to have similar effects on adult white perch.

83-000469 Sastry, K. V.; A. A. Siddiqui and S. K. Singh. ALTERATION IN SOME BIOCHEMICAL AND ENZYMOLOGICAL PARAMETERS IN THE SNAKE HEAD FISH *CHANNA PUNCTATUS*, EXPOSED CHRONICALLY TO QUINALPHOS. *Chemosphere* 11(12):1211-1216. 1982. SFA 28(1)
[Environ. Toxicol. Lab., Dep. Zool., D.A.V. (P.G.) Coll., Musaffarnager-251001, India]

83-000470 Shea, T. B. and E. S. Berry. CHRONIC EXPOSURE OF GOLDFISH-DERIVED CELL CULTURES TO TOXAPHENE ALTERS THE REPLICATION OF GOLDFISH VIRUS-2. *Bull. Environ. Contam. Toxicol.* 29(6):731-733. Dec. 1982. SFA 28(1)
[Dep. Biol., Northeastern Univ., Boston, MA 02115]

83-000471 Simakhov, Y. G. THE INFLUENCE OF BENZENE COMPOUNDS ON THE MITOTIC ACTIVITY OF THE EPITHELIUM OF THE EYE LENS OF RAINBOW TROUT, *SALMO GAIRDNERI*. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 22(1):135-140. 1982. SFA 28(1)
[All-Union Extramural Inst. Food Indus., Moscow, USSR]

83-000472 Simmons, M. S.; J. A. Sweetman; T. J. Miller and D. J. Jude. A SAPONIFICATION PROCEDURE FOR THE DETERMINATION OF SOME CHLORINATED HYDROCARBONS IN FISH. *J. Great Lakes Res.* 8(3):587-589. 1982. SFA 28(1)
[Dep. Environ. Indus. Health, Univ. Mich., Ann Arbor 48109]

83-000473 Slade, G. J. EFFECT OF IXTOC I CRUDE OIL AND COREXIT 9527 DISPERSANT ON SPOT (*LEIOSTOMUS XANTHURUS*) EGG MORTALITY. *Bull. Environ. Contam. Toxicol.* 29(5):525-530. Nov. 1982. SFA 28(1)
[Duke Univ., Durham, NC 27706]

83-000474 Sorensen, E. M. B.; T. L. Bauer; J. S. Bell and C. W. Harlan. SELENIUM ACCUMULATION AND CYTOTOXICITY IN TELEOSTS FOLLOWING CHRONIC, ENVIRONMENTAL EXPOSURE. *Bull. Environ. Contam. Toxicol.* 29(6):688-696. Dec. 1982. SFA 28(1)
[Dep. Pharmacol. Toxicol., Univ. Tex., Austin 78712]

83-000475 Sydor, W. J.; W. R. Miller III; J. Cairns, Jr. and D. Gruber. USE OF BOX AND LINE PLOTS TO ASSESS FISH VENTILATORY BEHAVIOR IN BIOLOGICAL MONITORING SYSTEMS. *Can. J. Fish. Aquatic Sci.* 39(12):1719-1722. Dec.

TOXICOLOGY; BIOASSAYS (CONTINUED)

83-000475 CONTINUED 1982. In English with French summ. SFA 28(1)
[Dep. Stat., VPI&SU, Blacksburg, VA 24061]

83-000476 Threader, R. W. and A. H. Houston. USE OF NaCl AS A REFERENCE TOXICANT FOR GOLDFISH, *CARASSIUS AURATUS*. *Can. J. Fish. Aquatic Sci.* 40(1):89-92. Jan. 1983. In English with French summ. SFA 28(1)
[Dep. Biol. Sci., Brock Univ., St. Catharines, ON L2S 3A1, Canada]

83-000477 Ullrich, S. O., Jr. and R. E. Millemann. SURVIVAL, RESPIRATION, AND FOOD ASSIMILATION OF *DAPHNIA MAGNA* EXPOSED TO PETROLEUM- AND COAL-DERIVED OILS AT THREE TEMPERATURES. *Can. J. Fish. Aquatic Sci.* 40(1):17-26. Jan. 1983. In English with French summ. SFA 28(1)
[Science Applications Inc., Oak Ridge, TN 37830]

83-000478 Ward, G. S. and P. R. Parrish. MANUAL OF METHODS IN AQUATIC ENVIRONMENT RESEARCH. PART 6. TOXICITY TESTS. *FAO Fish. Tech. Pap.* No. 15. viii + 23p. 1982. SFA 28(1)
[EG & G Bionomics Mar. Res. Lab., Pensacola, FL]

83-000479 Zitko, V. LETCUR, THE LETHALITY CURVE PROGRAM. *Can. Tech. Rep. Fish. Aquatic Sci.* No. 1134. iii + 10p. Nov. 1982. In English with French summ. SFA 28(1)
[Biol. Stn., St. Andrews, NB E0G 2X0, Canada]

RESEARCH AND MANAGEMENT-GENERAL

83-000480 Blumm, M. C. FULFILLING THE PARITY PROMISE: A PERSPECTIVE ON SCIENTIFIC PROOF, ECONOMIC COST, AND INDIAN TREATY RIGHTS IN THE APPROVAL OF THE COLUMBIA BASIN FISH AND WILDLIFE PROGRAM. *Environ. Law* 13(1):103-159. 1982. SFA 28(1)

83-000481 FAO of the UN. REPORT OF THE SECOND SESSION OF THE COMMISSION FOR INLAND FISHERIES OF LATIN AMERICA. *FAO Fish. Rep.* No. 261. vii + 39p. 1982. SFA 28(1)
[Rome, Italy]

83-000482 FAO of the UN. REPORT OF THE TWELFTH SESSION OF THE EUROPEAN INLAND FISHERIES ADVISORY COMMISSION, BUDAPEST, HUNGARY, 31 May-5 JUNE 1982. *FAO Fish. Rep.* No. 267. vi + 41p. 1982. SFA 28(1)
[Rome, Italy]

83-000483 Gerstung, E. FUTURE LOOKS BRIGHT FOR STATE'S GOLDEN TROUT. *Outdoor Calif.* 43(2):1-3,22. Mar.-Apr. 1982. SFA 28(1)

HABITAT ALTERATIONS

83-000484 Letichevskiy, M. A. PROSPECTS OF INCREASING THE ARTIFICIAL AND NATURAL REPRODUCTION OF THE INCONNU, *STENODUS LEUCICHTHYS*, IN THE LOWER COURSE AND DELTA OF THE VOLGA. *J. Ichthyol. (Engl. Transl. Vopr.*

HABITAT ALTERATIONS (CONTINUED)

83-000484 CONTINUED *Ikhtiol.*) 21(5):103-107. 1981. SFA 28(1)
[KaspNIRKh, Astrakhan, USSR] The results characterizing the age and qualitative composition of the spawning population of the inconnu, *Stenodus leucichthys*, over the last decade are analyzed. Results are presented on growth, spawning and the reproductive environment in the tailwaters below the Vologograd Hydroelectric Power Plant. Eggs spawned on open sandy grounds are almost completely eliminated by predators. Increasing the success of natural reproduction is possible by creating artificial spawning grounds in the zone below the dam of the Volograd Hydroelectric Power Plant.

83-000485 Marsh, P. C. and J. E. Luey. OASES FOR AQUATIC LIFE WITHIN AGRICULTURAL WATERSHEDS. *Fisheries (Bull. Am. Fish. Soc.)* 7(6):16-19,24. Nov.-Dec. 1982. SFA 28(1)
[Cent. Environ. Stud., Ariz. State Univ., Tempe] As expanding urban areas encroach upon productive agricultural lands, so agricultural demands result in drainage of millions of wetland acres and channelization of thousands of miles of stream courses. The impact of such alterations on aquatic biota can be disastrous. Yet natural stream reaches within these intensively developed agricultural watersheds can serve as oases for aquatic life, and possibly hold the key to restoration of damaged systems and preservation of threatened ones.

83-000486 Veshchev, P. V. EFFECT OF DREDGING OPERATIONS IN THE VOLGA RIVER ON MIGRATION OF STURGEON LARVAE. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 21(5):108-112. 1981. SFA 28(1)
[TsNIORKh, Astrakhan, USSR]

HARVEST, CREEL CENSUS, ETC.

83-000487 Andrusak, H. KOOTENAY LAKE SPORTFISHERY STATISTICS 1978-80. *B.C. Fish. Tech. Circ.* No. 53. ii + 22p. 1981. SFA 28(1)

83-000488 Combs, D. L. ANGLER EXPLOITATION OF PADDLEFISH IN THE NEOSHO RIVER, OKLAHOMA. *N. Am. J. Fish. Manage.* 2(4):334-342. 1982. SFA 28(1)
[Okla. Dep. Wildl. Conserv., Northeast Reg. Off., Rt. 1, Box 75-B, Porter 74454]

83-000489 Ford, B. S. STEELHEAD HARVEST ANALYSIS. *B.C. Fish. Tech. Circ.* No. 52. ii + 87p. 1982. SFA 28(1)

83-000490 Fraidenburg, M. E. and G. G. Bargmann. ESTIMATING BOAT-BASED FISHING EFFORT IN A MARINE RECREATIONAL FISHERY. *N. Am. J. Fish. Manage.* 2(4):351-358. 1982. SFA 28(1)
[Wash. Dep. Fish., Room 115, Gen. Admin. Bldg., Olympia 98504]

83-000491 Martin, W. E.; F. H. Bollman and R. L. Gum. ECONOMIC VALUE OF LAKE MEAD FISHERY. *Fisheries (Bull. Am. Fish. Soc.)* 7(6):20-24. Nov.-Dec. 1982. SFA 28(1)
[Dep. Agric. Econ., Univ. Ariz., Tucson] Water management in the Colorado River system has affected fish productivity adversely in Lake Mead. Knowledge of the economic value of the fishery would be useful in analyzing programs

HARVEST, CREEL CENSUS, ETC. (CONTINUED)

83-000491 CONTINUED to improve the fishery. Management agencies currently are especially interested in the largemouth bass fishery. Value is defined in terms of consumer's surplus. A fishing day is any portion of a day that an individual fished in Lake Mead. The mean value per fishing day is estimated as about $60 for general fishermen and $100 for largemouth bass club members. The total annual value of the fishery is estimated as $69 million, 15 percent of which is directly attributable to largemouth bass club members.

MARKING AND TAGGING

83-000492 Hislop, J. R. G. THE PRINCIPLES OF TAGGING EXPERIMENTS. *Scott. Fish. Bull.* 47:3-6. 1982. SFA 28(1)
[Mar. Lab., P.O. Box 101, Victoria Rd., Torry, Aberdeen AB9 8DB, Scotland]

83-000493 MacKenzie, K. FISH PARASITES AS BIOLOGICAL TAGS. *Scott. Fish. Bull.* 47:27-32. 1982. SFA 28(1)
[Mar. Lab., P.O. Box 101, Victoria Rd., Torry, Aberdeen AB9 8DB, Scotland]

83-000494 Moodie, G. E. E. and I. G. Salfert. EVALUATION OF FLUORESCENT PIGMENT FOR MARKING A SCALELESS FISH, THE BROOK STICKLEBACK. *Prog. Fish-Cult.* 44(4):192-195. Oct. 1982. SFA 28(1)
[Dep. Biol., Univ. Winnipeg, Winnipeg, MB R3B 2E9, Canada]

STOCKING AND INTRODUCTIONS

83-000495 Anderson, G. A. CATCHABLE RAINBOW TROUT STUDIES FOR THE LOSTINE, IMNAHA, AND WALLOWA RIVERS. *Oreg. Dep. Fish Wildl. Inf. Rep.* No. 82-9. 18p. Oct. 1982. SFA 28(1)

A study was conducted of portions of the Lostine, Imnaha, and Wallowa rivers in Wallowa County, Oregon, to determine angler activity and catch of hatchery rainbow trout released at legal size. Catch estimates showed: For the Lostine River in 1976, 1,933 anglers fished 7,020 h to catch 6,329 hatchery rainbow--a return to the angler of 63% of the 10,000 trout stocked. For the Imnaha River in 1978, 747 anglers fished 3,733 h to catch 3,216 hatchery rainbow trout--a return to the angler of 40% of the 8,000 trout stocked. For the Wallowa River in 1979, 6,595 angler h were expended to catch 1,547 wild rainbow trout, and 6,724 hatchery rainbow trout--a return to the angler of 61% of the 11,000 trout stocked.

83-000496 Donald, D. B. and R. S. Anderson. IMPORTANCE OF ENVIRONMENT AND STOCKING DENSITY FOR GROWTH OF RAINBOW TROUT IN MOUNTAIN LAKES. *Trans. Am. Fish. Soc.* 111(6):675-680. Nov. 1982. SFA 28(1)
[Can. Wildl. Serv., #1000, 9942 108 St., Edmonton, AB T5K 2J5, Canada]

83-000497 Munro, A. L. S. PROSPECTS FOR ENHANCING BRITISH FISHERY RESOURCES BY RELEASE OF CULTURED JUVENILES. *Scott. Fish. Bull.* 47:32-39. 1982. SFA 28(1)
[Mar. Lab., P.O. Box 101, Victoria Rd., Torry, Aberdeen AB9 8DB, Scotland]

83-000498 Reid, D. THE FIRST PINKS IN LAKE ERIE. *Ontario Fish Wildl.* 19(3):2-5. 1982. SFA 28(1)

STOCKING AND INTRODUCTIONS (CONTINUED)

83-000499 Slaney, P. A.; S. J. Billings and H. A. Smith. EXPERIMENTAL STOCKING OF STEELHEAD FRY ABOVE BARRIERS IN A HIGH GRADIENT TRIBUTARY OF THE KEOGH RIVER: PROGRESS 1978 AND 1979. *B.C. Fish. Tech. Circ.* No. 48. iii + 28p. 1980. SFA 28(1)

83-000500 Stringer, G. E.; A. F. Tautz; T. G. Halsey and C. Houston. FURTHER DEVELOPMENT AND TESTING OF A LAKE STOCKING FORMULA FOR RAINBOW TROUT IN BRITISH COLUMBIA. *B.C. Fish. Tech. Circ.* No. 75. 23p. 1980. SFA 28(1)

FISHING GEAR AND TECHNIQUES

83-000501 Nedelec, C. DEFINITION AND CLASSIFICATION OF FISHING GEAR CATEGORIES. *FAO Fish. Tech. Pap.* No. 222. viii + 51p. 1982. SFA 28(1)
[FAO of the UN, Rome, Italy]

83-000502 Negus, M. T. MODIFIED ANCHORING SYSTEM FOR VERTICAL GILL NETS. *N. Am. J. Fish. Manage.* 2(4):412-413. 1982. SFA 28(1)
[Me. Coop. Fish. Res. Unit, Dep. Zool., Univ. Me., Orono 04469]

83-000503 Nero, R. W. A DESCRIPTION OF THREE NETS SUITABLE FOR ESTIMATING THE ABUNDANCE OF *MYSIS RELICTA*. *Can. Tech. Rep. Fish. Aquatic Sci.* No. 1046. iv + 8p. July 1982. In English with French summ. SFA 28(1)
[Dep. Fish. Oceans, Winnipeg, MB R3T 2N6, Canada]

83-000504 Schuldt, R. J. and J. W. Heinrich. PORTABLE TRAP FOR COLLECTING ADULT SEA LAMPREYS. *Prog. Fish-Cult.* 44(4):220-221. Oct. 1982. SFA 28(1)
[U.S. FWS, Sea Lamprey Control Stn., Marquette, MI 49855]

FERTILIZATION OF SOIL AND WATER

83-000505 Milbrink, G. and S. Holmgren. ADDITION OF ARTIFICIAL FERTILIZERS AS A MEANS OF REDUCING NEGATIVE EFFECTS OF "OLIGOTROPHICATION" IN LAKES AFTER IMPOUNDMENT. *Inst. Freshwater Res. Drottningholm Rep.* No. 59. 97-120. 1981. SFA 28(1)
[Inst. Freshwater Res., S-170 11 Drottningholm, Sweden] There have hitherto been few biological methods at hand for compensating the most adverse effects of impoundment. Four seasons of "partial fertilization" in the impounded Lake Anjan have indicated that nutrient enrichment (nitrogen and phosporus in a fixed ratio) is an effective way of locally restoring fish populations in such lakes. Continuous nutrient enrichment of a small stream leading into a half-secluded bay of the lake promoted the development of an exceedingly rich zooplankton fauna in the bay which primarily favoured the char which largely became attracted to the area and rapidly improved in quality. Also the stream bottom fauna improved considerably for the benefit of brown trout, grayling and char. The rich availability of prey animals (especially zooplankton) is reflected in a high degree of niche-overlapping in the food of the fish species mentioned. The results of the present study suggest that it is possible to produce and retain positive "damming-up effects" (Nilsson 1973), which generally follow though for a limited time the damming of water, provided the enrichment is kept under proper control. An obvious case of seasonal feeding migration has simultaneously been studied in a system of small, organically polluted lakes connected with a larger oligotrophic lake via a narrow stream about 5 kilometers long. Balanced nutrient enrichment of ideally shaped bays of oligotrophic lakes is here suggested for the twofold

FERTILIZATION OF SOIL AND WATER (CONTINUED)

83-000505 CONTINUED purposes of improving the condition and the stock size of salmonid fish and increasing the buffering capacity against acidification--now rapidly in progress even in northern Scandinavia. The method is partly in controversy with the general policy of indiscriminately purifying sewage water as much as possible.

83-000506 Milbrink, G. and S. Holmgren. FISH SPECIES INTERACTIONS IN A FERTILIZED RESERVOIR. *Inst. Freshwater Res. Drottningholm Rep.* No. 59. 121-127. 1981. SFA 28(1)
[Inst. Freshwater Res., S-170 11 Drottningholm, Sweden] "Partial fertilization" of the impounded Lake Anjan in northern Sweden gave rise to a most interesting experimental situation with dramatic changes in the intensities of interactive segregation between the fish species involved, from a situation of intense resource partitioning in the regulated phase-with phase--with little available nourishment--to a high level of niche-overlapping in the enriched phase--with a superabundance of food items (*Eurycercus lamellatus*, in particular). The possibilities of "the vacant niche space" in the latter situation being filled up by the currently depressed fish species as the three-spine stickleback--if at all present within the water system--are discussed at some length and have also made a brief discussion on specific dominance hierarchies (Svärdson, 1976) motivated.

83-000507 Reeves, W. C. PORTABLE BARGE FOR APPLYING LIME AT COMMUNITY LAKES. *Prog. Fish-Cult.* 44(4):185-186. Oct. 1982. SFA 28(1)
[State Dep. Conserv. Nat. Resour., 64 N. Union St., Montgomery, AL 36130]

FISHWAYS, FISH PASSAGE THROUGH DAMS, ETC.

83-000508 Densen, W. L. T. van and R. H. Hadderingh. EFFECTS OF ENTRAPMENT AND COOLING WATER DISCHARGE BY THE BERGUM POWER STATION ON 0+ FISH IN THE BERGUMERMEER. *Hydrobiologia* 95:351-368. 29 Sept. 1982. SFA 28(1)
[Limnol. Inst., Tjeukemeer Lab., De Akkers 47, 8536 VD Oosterzee, The Netherlands] The numbers, distribution and size of 0+ fish in Bergumermeer and in the colling water system of the Bergum Power Station were registered from 1978 to 1981. An exponentially decreased vulnerability to entrapment by the power station was found with increasing size of fish. Because of the large water intake in relation to the lake volume, entrainment mortality of fish larvae in May and June is large and probably of the same order of magnitude as the natural mortality. In the same period the Bergumermeer can be supplied with large amounts of fish larvae, immigrating passively with the water current. Impingement mortality later on in the season is insignificant compared with natural mortality. The heated effluents from the power station influence the distribution and the size of 0+ fish in the lake. Year-class strength of pikeperch may be improved due to the larger size of 0+ pikeperch. Less water intake as a possibility to minimize entrainment is discussed.

83-000509 Madenjian, C. P. and D. J. Jude. ERROR BOUNDS FOR ESTIMATES OF ENTRAINED ICHTHYOPLANKTON. *Can. J. Fish. Aquatic Sci.* 40(1):10-16. Jan. 1983. In English with French summ. SFA 28(1)
[Great Lakes Res. Div., Univ. Mich., Ann Arbor 48109]

83-000510 Moffitt, C. M.; B. Kynard and S. G. Rideout. FISH PASSAGE FACILITIES AND ANADROMOUS FISH RESTORATION IN THE CONNECTICUT RIVER BASIN. *Fisheries (Bull. Am. Fish. Soc.)* 7(6):2-11. Nov.-Dec. 1982. SFA 28(1)

FISHWAYS, FISH PASSAGE THROUGH DAMS, ETC. (CONTINUED)

83-000510 CONTINUED
[Coop. Fish. Res. Unit, Dep. Fish Wildl. Resour., Univ. Idaho, Moscow 83843]

83-000511 Patterson, R. L. and K. D. Smith. IMPACT OF POWER PLANT ENTRAINMENT OF ICHTHYOPLANKTON ON JUVENILE RECRUITMENT OF FOUR FISHES IN WESTERN LAKE ERIE IN 1975-77. *J. Great Lakes Res.* 8(3):558-569. 1982. SFA 28(1)
[Sch. Nat. Resour., Univ. Mich., Ann Arbor 48109]

MATHEMATICS, STATISTICAL METHODS, AND MODELING

83-000512 Bohlin, T. METHODS OF ESTIMATING TOTAL STOCK, SMOLT OUTPUT AND SURVIVAL OF SALMONIDS USING ELECTROFISHING. *Inst. Freshwater Res. Drottningholm Rep.* No. 59. 5-14. 1981. SFA 28(1)
[Dep. Zool., Univ. Gothenburg, Box 25059, S-400 31 Gothenburg, Sweden]

83-000513 Bulgakova, T. I. and Y. N. Efimov. A METHOD FOR FORECASTING CATCH BY CONSIDERATION OF THE DEPENDENCE OF NATURAL MORALITY UPON AGE. *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 22(2):24-32. 1982. SFA 28(1)
[VNIRO, Moscow, USSR]

83-000514 Csirke, J. and J. F. Caddy. PRODUCTION MODELING USING MORTALITY ESTIMATES. *Can. J. Fish. Aquatic Sci.* 40(1):43-51. Jan. 1983. In English with French summ. SFA 28(1)
[Mar. Resour. Serv., Fish. Dep., FAO, Via delle Terme di Caracalla, 00100 Rome, Italy]

83-000515 Cuenco, M. L. A MODEL OF FISH BIOENERGETICS AND GROWTH AT THE ORGANISMAL AND POPULATION LEVELS IN LABORATORY AND POND ENVIRONMENTS. *Ph.D. dissertation, Tex. A&M Univ.* 213p. 1982. From Diss. Abstr. Int. B Sci. Eng. 43(6):1761. Dec. 1982. SFA 28(1)

83-000516 Davies, W. D.; W. L. Shelton and S. P. Malvestuto. PREY-DEPENDENT RECRUITMENT OF LARGEMOUTH BASS: A CONCEPTUAL MODEL. *Fisheries (Bull. Am. Fish. Soc.)* 7(6):12-15. Nov.-Dec. 1982. SFA 28(1)
[Dep. Fish. Allied Aquacult., Auburn Univ., Auburn, AL] A prey-dependent recruitment model is depicted that relates recruitment of largemouth bass at age 1+ to the availability of small-sized bluegills as prey throughout the summer. These concepts were developed by comparing the dynamics of growth and recruitment of young-of-the-year largemouth bass and their prey in fertilized farm ponds, public fishing lakes, and a mainstream reservoir in Southeastern United States. The model suggests that management strategy for systems with diverse and possibly competing species hinges on being able to maintain adequate size structure within populations through bass predation so that each species reproduces periodically and a sufficient number survive and grow rapidly.

83-000517 Sinclair, M.; R. O'Boyle and T. D. Iles. CONSIDERATION OF THE STABLE AGE DISTRIBUTION ASSUMPTION IN "ANALYTICAL" YIELD MODELS. *Can. J. Fish. Aquatic Sci.* 40(1):95-101. Jan. 1983. In English with French summ.

MATHEMATICS, STATISTICAL METHODS, AND MODELING (CONTINUED)

83-000517 CONTINUED SFA 28(1)
[Halifax Fish. Res. Lab., Halifax, NS B3J 2S7, Canada]

LAKE MANAGEMENT AND RESEARCH

83-000518 FAO of the UN. COMMITTEE FOR INLAND FISHERIES OF AFRICA (CIFA). REPORT OF THE FIRST SESSION OF THE SUB-COMMITTEE FOR THE DEVELOPMENT AND MANAGEMENT OF THE FISHERIES OF LAKE VICTORIA. *FAO Fish. Rep.* No. 262. vii + 71p. 1982. SFA 28(1)
[Rome, Italy]

83-000519 Harris, H. J.; D. R. Talhelm; J. J. Magnuson and A. M. Forbes. GREEN BAY IN THE FUTURE--A REHABILITATIVE PROSPECTUS. *Great Lakes Fish. Comm. Tech. Rep.* No. 38. vii + 59p. Sept. 1982. SFA 28(1)
[Great Lakes Fish. Comm., 1451 Green Rd., Ann Arbor, MI 48105]

83-000520 Lee, B. J.; H. A. Regier and D. J. Rapport. TEN ECOSYSTEM APPROACHES TO THE PLANNING AND MANAGEMENT OF THE GREAT LAKES. *J. Great Lakes Res.* 8(3):505-519. 1982. SFA 28(1)
[Inst. Environ. Stud., Univ. Toronto, Toronto, ON M5S 1A4, Canada] During the past decade or so, many researchers, planners and managers the world over have propounded some version of "ecosystem approach" for problems and opportunities with the natural environment and renewable resources. Most of these approaches share the following features: a primary focus on ecological phenomena as opposed to engineering, economic, or jurisdictional phenomena; a perception of some self-regulatory capacity on the part of an ecosystem; a recognition of the marked responsiveness of many ecological systems to natural and human activities; and a readiness to strike a pragmatic compromise between detailed reductionistic understanding and more comprehensive, holistic meaning. Great Lakes workers are now trying to implement operational and institutional forms of ecosystem approach. Ten of these initiatives are assessed here, taken from all government levels, directed toward open lake, coastal, and hinterland components of the basin. This comparison illustrates the range of proposals now under consideration in the basin and identifies their common elements. We offer these features as defining criteria of an ecosystem approach with the suggestion that thorough-going synthesis or standardization be avoided. Flexible eclectic pragmatism is, we suggest, the most productive attitude toward Great Lakes environmental problems.

83-000521 Oliver, M. K. and K. R. McKaye. FLOATING ISLANDS: A MEANS OF FISH DISPERSAL IN LAKE MALAWI, AFRICA. *Copeia* 1982(4):748-754. 21 Dec. 1982. SFA 28(1)
[Yale Univ., Dep. Biol., 260 Whitney Ave., P.O. box 6666, New Haven, CT 06571] Floating masses of vegetation are commonly seen in the southern region of Lake Malawi. These floating islands disperse littoral fishes across deep portions of the lake. Six islands were sampled and all yielded fishes. The 129 individuals collected belong to ten species, including one mormyrid, one cyprinid, two clariids, one cyprinodontid, four cichlids and one mastacembelid. Most of the species are characteristic of lakeshore swamps and are not endemic to Lake Malawi. Dispersal by floating islands may increase gene flow between disjunct populations of widespread species, particularly those inhabiting swamps. Such dispersal, theoretically, could also serve to establish founder populations of geographically isolated species.

LAKE MANAGEMENT AND RESEARCH (CONTINUED)

83-000522 Prepas, E. E. TOTAL DISSOLVED SOLIDS AS A PREDICTOR OF LAKE BIOMASS AND PRODUCTIVITY. *Can. J. Fish. Aquatic Sci.* 40(1):92-95. Jan. 1983. In English with French summ. SFA 28(1)
[Dep. Zool., Univ. Alberta, Edmonton, AB T6G 2E9, Canada]

RIVER AND STREAM MANAGEMENT AND RESEARCH

83-000523 Platts, W. S. and F. E. Partridge. INVENTORY OF SALMON, STEELHEAD TROUT, AND BULL TROUT: SOUTH FORK SALMON RIVER, IDAHO. *USDA For. Serv., Intermount. For. Range Exp. Stn.* 1983. Available from U.S. Forest Serv., Intermountain For. Range Exp. Stn., 507 25th St., Ogden, UT 84401. SFA 28(1)
Aquatic habitat and respective fish populations were studied in the South Fork Salmon River during the summer of 1977. From the Warm Lake Bridge to the headwaters the channel consisted of 74 percent riffle and 26 percent pool, with surface substrate of 21 percent boulder, 40 percent rubble, 24 percent gravel, and 15 percent fine sediment. Below the Warm Lake Bridge to the confluence of the Secesh River the channel consisted of 55 percent riffle and 45 percent pool, with surface substrate of 32 percent boulder, 35 percent rubble, and 16 percent gravel, and 17 percent fine sediment. Juvenile chinook salmon and rainbow-steelhead trout were found throughout the river, except in the upper 5 miles (8 km), where only bull trout were found. The river reach in the Stolle Meadows contained the highest densities of fish, with juveniles chinook salmon and sculpin the most numberous fish present. Chinook salmon and rainbow-steelhead trout densities were lower than reported in most other Idaho streams having anadromous fishes,. Of the habitat attributes measured, only stream width showed any correlation with fish populations. As stream width increased in the river reach above the Warm Lake Bridge, bull trout number decreased.

83-000524 Platts, W. S. IMPAIRMENT, PROTECTION AND REHABILITATION OF PACIFIC SALMONID HABITATS ON SHEEP AND CATTLE RANGES. *IN Propagation, Enhancement, and Rehabilitation of Anadromous Salmonid Populations and Habitat Symposium. Humboldt State Univ., Arcata, Calif.* p. 82-92. 1981. Reprint available from U.S. For. Serv., Intermount. For. Range Exp. Stn., 507 25th St., Ogden, UT 84401] Examples of grazing strategies and classes of livestock that impair, protect, or enhance the salmonid fishery are discussed. Recommendations are given for attaining better stream habitats by identifying some possible improvements in streamside range management.

83-000525 Platts, W. S. PROTECTION AND ENHANCEMENT OF PACIFIC SALMONIDS ON RANGES GRAZED BY LIVESTOCK: AN OVERVIEW. *IN Propagation, Enhancement, and Rehabilitation of Anadromous Salmonid Populations and Habitat Symposium. Humboldt State Univ., Arcata, Calif.* p. 62-65. 1981. Reprint available from U.S. For. Serv., Intermount. For. Range Exp. Stn., 507 25th St., Ogden, UT 84401] When European man arrived on the Pacific Coast, the streams were teeming with salmonids in a natural environment. Since the mid-1800's, a decline in the quality of the salmonid habitat has occurred. One land use responsible for part of this decline has been improper grazing by both sheep and cattle. The solution that will reverse this decline rest with range and fishery specialists, who must coordinate their studies and tackle the riparian issue together. They must determine the suitability of each habitat type for grazing, and the correct grazing strategy with proper animal distribution.

83-000526 Platts, W. S.; W. F. Megahan; G. W. Minshall. METHODS FOR EVALUATING STREAM, RIPARIAN, AND BIOTIC CONDITIONS. *U.S. For. Serv. Intermount. For. Range Exp. Stn. Tech. Rep.* INT-138. 90p. 1983. Available

RIVER AND STREAM MANAGEMENT AND RESEARCH (CONTINUED)

83-000526 CONTINUED from U.S. For. Serv., 507 25th St., Ogden, UT 84401. SFA 28(1)

Most stream habitat evaluation techniques currently in use today have not been tested to determine their validity in describing conditions and have been designed to optimize time rather than accuracy. The purpose of this report is to further standardize the way physical and biological attributes are measured and quantified and to shed light on the strengths and weaknesses of those attributes. This report discusses some of the environmental parameters that best measure and describe conditions existing in aquatic ecosystems. The precision and an estimation of the accuracy that can be expected when measuring many of these conditions are given.

83-000527 Riedel-Lorjé, J. C. and T. Gaumert. 100 JAHRE ELBE-FORSCHUNG HYDROBIOLOGISCHE SITUATION UND FISCHBESTAND 1842-1943 UNTER DEM EINFLUß VON STROMVERBAU UND SIELEINLEITUNGEN. [A CENTURY OF ELBE RESEARCH: HYDROBIOLOGICAL CONDITIONS AND FISH POPULATIONS FROM 1842 TO 1943 UNDER THE INFLUENCE OF CONSTRUCTION PROJECTS AND SEWAGE DISCHARGE.] *Arch. Hydrobiol. Supplementb.* 61(3):317-376. In German with English summ. SFA 28(1)

[Rainvilleterrasse 9, D-2000 Hamburg 50, West Germany] The Elbe, one of the major European rivers, flows from the Riesengebirge to the North Sea. This glacial river was little influenced by man until almost the middle of the 19th century, but after 1840, strong negative influences developed as a result of extensive construction to modify the river banks and the input of concentrated sewage. This paper is a historical review concerned with the limnological effects. Early hydrobiological and fishery investigations showed that the Elbe was still in a relatively pristine condition, apparently because the long-term effects of the channelization had not yet manifested themselves. Studies of various animal and plant taxa as well as of individual biotic communities yielded very extensive lists of flora and fauna, exemplified by that of the fish found in the Elbe between Bohemia and the estuary. The early reports, however, included no precise information on the abundance of the species. At the turn of the century, significant changes were noted. Complaints from fishermen about decreases in the catch became more frequent. There were several causes for this. The sturgeon was eliminated by overfishing. Construction projects and sewage took a great toll on the salmon. Many fish species had suffered greatly from the elimination of their spawning grounds by the rapid deposition of silt and dredging operations and from periodic mass mortalities. Natural as well as anthropogenic influences produced oxygen shortages, and another negative development since 1915 was the introduction and rapid spread of the full-hand crab. Other organisms also reflected the conditions in the river during those years. Sessile animals in the Elbe near Hamburg showed a much poorer settlement rate directly downstream from the sewer outlets than at sites on the other side of the river. However, the spectrum of species present, according to reports of many authors, has remained identical for almost a century. This chronical ends with the Second World War. In the post-war period, the results of a great many Elbe investigations have been published in the "Elbe Estuary" supplement series of the Archiv für Hydrobiologie.

83-000528 Schnick, R. A.; J. M. Morton; J. C. Mochalski and J. J. Beall. MITIGATION AND ENHANCEMENT TECHNIQUES FOR THE UPPER MISSISSIPPI RIVER SYSTEM AND OTHER LARGE RIVERS SYSTEMS. *U.S. Fish Wildl. Serv. Resour. Publ.* 149. xxiv + 714p. 1982. SFA 28(1)

83-000529 Ward, B. R. and P. A. Slaney. EVALUATION OF IN-STREAM ENHANCEMENT STRUCTURES FOR THE PRODUCTION OF JUVENILE STEELHEAD TROUT AND COHO SALMON IN THE KEOGH RIVER: PROGRESS 1977 AND 1978. *B.C. Fish. Tech. Circ.* No. 45. iii + 47p. 1979. SFA 28(1)

RIVER AND STREAM MANAGEMENT AND RESEARCH (CONTINUED)

83-000530 Weber, D. A. COLORADO STREAM DATA BANK USER'S GUIDE. *Colo. Div. Wildl.* DOW-R-M-8-83. 28p. Jan. 1983. SFA 28(1)
[Ecol. Serv. Sect., Colo. Div. Wildl., 6060 Broadway, Denver 80216]

FARM POND AND SMALL IMPOUNDMENT MANAGEMENT AND RESEARCH

83-000531 Lynch, W. E., Jr.; D. L. Johnson and S. A. Schell. SURVIVAL, GROWTH, AND FOOD HABITS OF WALLEYE X SAUGER HYBRIDS (SAUGEYE) IN PONDS. *N. Am. J. Fish. Manage.* 2(4):381-387. 1982. SFA 28(1)
[Sch. Nat. Resour., Div. Fish. Wildl. Manage., Ohio State Univ., Columbus 43210]

83-000532 Stone, C. C. and T. Modde. GROWTH AND SURVIVAL OF LARGEMOUTH BASS IN NEWLY STOCKED SOUTH DAKOTA PONDS. *N. Am. J. Fish. Manage.* 2(4):326-333. 1982. SFA 28(1)
[S. Dak. Dep. Game Fish Parks, RR1, Box 240, Yankton 57078]

LARGE IMPOUNDMENT MANAGEMENT AND RESEARCH

83-000533 Abdel-Malek, S. A. BIOLOGICAL PRODUCTIVITY OF LAKE QARUN (ARAB REPUBLIC OF EGYPT). *J. Ichthyol. (Engl. Transl. Vopr. Ikhtiol.)* 21(6):22-32. 1981. SFA 28(1)
[VNIRO, Moscow, USSR] Change in the composition of the ichthyofauna and food base of lake Qarun was studied in relation to its salinization due to mineralized drainage water. Measures on reconstruction of the ichthyofauna are recommended. The possibility of supplementing the ichthyofauna with some marine species has been investigated.

83-000534 Aggus, L. R. and W. M. Bivin. HABITAT SUITABILITY INDEX MODELS: REGRESSION MODELS BASED ON HARVEST OF COOLWATER AND COLDWATER FISHES IN RESERVOIRS. *U.S. Fish Wildl. Serv.* FWS/OBS-82/10.25. viii + 38p. Sept. 1982. SFA 28(1)
[U.S. FWS, Natl. Reservoir Res. Prog., Fayetteville, AR]

83-000535 Rainwater, W. C. and A. Houser. SPECIES COMPOSITION AND BIOMASS OF FISH IN SELECTED COVES IN BEAVER LAKE, ARKANSAS, DURING THE FIRST 18 YEARS OF IMPOUNDMENT (1963-1980). *N. Am. J. Fish. Manage.* 2(4):316-325. 1982. SFA 28(1)
[U.S. FWS, South Cent. Reservoir Invest., Fayetteville, AR 72701]

83-000536 Strange, R. J.; W. B. Kittrell and T. D. Broadbent. EFFECTS OF SEEDING RESERVOIR FLUCTUATION ZONES ON YOUNG-OF-THE-YEAR BLACK BASS AND ASSOCIATED SPECIES. *N. Am. J. Fish. Manage.* 2(4):307-315. 1982. SFA 28(1)
[Dep. For. Wildl. Fish., Univ. Tenn., Knoxville 37916]

ESTUARY MANAGEMENT AND RESEARCH

83-000537 Boesch, D. F., (ed.). PROCEEDINGS OF THE CONFERENCE ON COASTAL EROSION AND WETLAND MODIFICATION IN LOUISIANA: CAUSES, CONSEQUENCES, AND OPTIONS. *U.S. Fish Wildl. Serv.* FWS/OBS-82/59. viii + 256p. Sept. 1982.

ESTUARY MANAGEMENT AND RESEARCH (CONTINUED)

83-000537 CONTINUED Available from Natl. Coastal Ecosystems Team, NASA/Slidel Computer Complex, 1010 Gause Blvd., Slidell, LA 70458. SFA 28(1)

MARINE MANAGEMENT AND RESEARCH

83-000538 Bagenal, T. B.; E. Dahm; T. Lindem and P. Tuunainen. EIFAC EXPERIMENTS ON PELAGIC FISH STOCK ASSESSMENT BY ACOUSTIC METHODS IN LAKE KONNEVESI, FINLAND. *EIFAC Occas. Pap.* No. 14. v + 16p. 1982. Available from FAO of the UN, Rome, Italy. SFA 28(1)

83-000539 Bailey, R. S.; J. A. Morrison and A. Saville. THE BIOLOGICAL BASIS OF THE CLYDE HERRING FISHERY. *Scott. Fish. Bull.* 47:16-22. 1982. SFA 28(1)
[Mar. Lab., P.O. Box 101, Victoria Rd., Torry, Aberdeen AB9 8DB, Scotland]

83-000540 Baxter, J. L. THE ROLE OF THE MARINE RESEARCH COMMITTEE AND CALCOFI. *Calif. Coop. Oceanic Fish. Invest.* 23:35-38. Oct. 1982. SFA 28(1)

83-000541 Clark, F. N. CALIFORNIA MARINE FISHERIES INVESTIGATIONS, 1914-1939. *Calif. Coop. Oceanic Fish. Invest.* 23:25-28. Oct. 1982. SFA 28(1)

83-000542 Croker, R. S. AN ICONOCLAST'S VIEW OF CALIFORNIA FISHERIES RESEARCH, 1929-1962. *Calif. Coop. Oceanic Fish. Invest.* 23:29-34. Oct. 1982. SFA 28(1)

83-000543 FAO of the UN. REPORT OF THE FIFTH SEESION OF THE WORKING PARTY ON RESOURCE EVALUATION. DAKAR, SENEGAL, 15-17 OCTOBER 1980. *FAO Fish. Rep.* No. 244. vi + 127p. 1981. SFA 28(1)
[Rome, Italy]

83-000544 FAO of the UN. REPORT OF THE TENTH SESSION. COORDINATING WORKING PARTY ON ATLANTIC FISHERY STATISTICS. MADRID, SPAIN, 22-29 JULY 1980. *FAO Fish. Rep.* No. 242. viii + 65p. 1980. SFA 28(1)
[Rome, Italy]

83-000545 FAO of the UN. GENERAL FISHERIES COUNCIL FOR THE MEDITERRANEAN (GFCM) REPORT OF THE SECOND TECHNICAL CONSULTATION ON STOCK ASSESSMENT IN THE BALEARIC AND GULF OF LIONS STATISTICAL DIVISIONS. *FAO Fish. Rep.* No. 263. ix + 165p. 1982. In English and French. SFA 28(1)
[Rome, Italy]

83-000546 FAO of the UN. REPORT OF THE THIRD SESSION OF THE WESTERN CENTRAL ATLANTIC FISHERY COMMISSION. HAVANA, CUBA, 18-22 NOVEMBER 1980. *FAO Fish. Rep.* No. 246. viii + 44p. 1981. SFA 28(1)
[Rome, Italy]

MARINE MANAGEMENT AND RESEARCH (CONTINUED)

83-000547 FAO of the UN. REPORT OF THE THIRD SESSION OF THE SUB-COMMETTEE ON MANAGEMENT OF RESOURCES WITHIN THE LIMITS OF NATIONAL JURISDICTION. DAKAR, SENEGAL, 28-30 JANUARY 1981. *FAO Fish. Rep.* No. 250. vii + 47p. 1981. SFA 28(1)
[Rome, Italy]

83-000548 McEvoy, A. F. SCIENTIFIC RESEARCH AND THE TWENTIETH-CENTURY FISHING INDUSTRY. *Calif. Coop. Oceanic Fish. Invest.* 23:48-55. Oct. 1982. SFA 28(1)

83-000549 Powell, P. P. PERSONALITIES IN CALIFORNIA FISHERY RESEARCH. *Calif. Coop. Oceanic Fish. Invest.* 23:43-47. Oct. 1982. SFA 28(1)

83-000550 Radovich, J. THE COLLAPSE OF THE CALIFORNIA SARDINE FISHERY. WHAT HAVE WE LEARNED? *Calif. Coop. Oceanic Fish. Invest.* 23:56-78. Oct. 1982. SFA 28(1)

83-000551 Thurow, F. SUSTAINED FISH SUPPLY. AN INTRODUCTION TO FISHERY MANAGEMENT. *Arch. Fischereiwiss.* 33(1-2):1-42. Nov. 1982. SFA 28(1)
[Inst. Küsten- Binnenfisch. Bundesforsch. Fisch., Hamburg, West Germany]
The paper shows that ocean resources are not unlimited but renewable if properly utilized. So far investment in developing, but unregulated fisheries tended to go on long after the highest sustainable yield was exceeded. It is therefore essential that any fishery is regulated from its very beginning. Case studies reveal that the annual wastage of money in the 70s, mainly arising through failure to regulate the fishery or to take appropriate measures, amounted to several hundred million dollars. Infringement of regulations seems to occur everywhere. Non-complicance of the law, on purpose or unintentional, should be met by enlightenment through appropriate information (education) and by spot checks. Several stocks have been fished down to a very low level so the recruit numbers are seriously reduced. There is some evidence even then that these stocks may recover if the fishery is fully closed.

83-000552 Trumble, R. J.; R. E. Thorne and N. A. Lemberg. THE STRAIT OF GEORGIA HERRING FISHERY: A CASE HISTORY OF TIMELY MANAGEMENT AIDED BY HYDROACOUSTIC SURVEYS. *NOAA Fish. Bull.* 80(2):381-388. Apr. 1982. SFA 28(1)
[Wash. Dep. Fish., M-1 Fish. Cent. WH-10, Univ. Wash., Seattle 98195]

83-000553 Tseitlin, V. B. ESTIMATION OF THE BIOMASS AND PRODUCTION OF MESOPELAGIC FISH IN THE WORLD OCEAN. *Dokl. Biol. (Engl. Transl. Dokl. Akad. Nauk SSSR Ser. Biol.)* 264(1-6):345-347. May-June 1982. SFA 28(1)
[P.P. Shirshov Inst. Oceanogr., Acad. Sci. USSR, Moscow, USSR]

83-000554 Zieman, J. C. THE ECOLOGY OF THE SEAGRASSES OF SOUTH FLORIDA: A COMMUNITY PROFILE. *U.S. Fish Wildl. Serv.* FWS/OBS-82/25. viii + 124p. Sept. 1982. Available from Information Transfer Specialist, Natl. Coastal Ecosystems Team, U.S. FWS, NASA/Slidell Computer Complex, 1010 Gause Blvd., Sidell, LA 70458. SFA 28(1)

REVIEWS, BIBLIOGRAPHIES, ETC.

83-000555 FAO of the UN. STADES PRELEPTOCEPHALE, LEPTOCEPHALE ET CIVELLE DU GENRE *ANGUILLA* BIBLIOGRAPHIE (1829-1980). [PRELEPTOCEPHALE, LEPTOCEPHALE AND ELVER STAGES OF THE GENUS *ANGUILLA*. BIBLIOGRAPHY (1829-1980).] *FAO Fish. Circ.* No. 738. ix + 45p. 1982. SFA 28(1)

WATERSHED MANAGEMENT

83-000556 Naiman, R. J. CHARACTERISTICS OF SEDIMENT AND ORGANIC CARBON FROM PRISTINE BOREAL FOREST WATERSHEDS. *Can. J. Fish. Aquatic Sci.* 39(12):1699-1718. Dec. 1982. In English with French summ. SFA 28(1)
[Woods Hole Oceanogr. Inst., Woods Hole, MA 02543]

Abad, M. A.
83-000463
Abalmazova, M. G.
83-000197
Abdel-Malek, S. A.
83-000533
Abell, P. R.
83-000202
Ackefors, H.
83-000004
Addison, R. F.
83-000455
Adron, J. W.
83-000027
Aggus, L. R.
83-000534
Ahlstrom, E. H.
83-000336
Ahne, W.
83-000409
Akert, K.
83-000096
Akintunde, E. A.
83-000276
Alani, E.
83-000106
Alderdice, D. F.
83-000291
Alekseyev, F. E.
83-000242
Alekseyev, F. Y.
83-000243
Alekseyeva, E. I.
83-000242
Alekseyeva, Y. I.
83-000243
Alexander, H. C.
83-000449
Allen, J. R. M.
83-000099
Alvarez-Lajonchere, L.
83-000244
Amaral, A. D.
83-000110
Amborski, R. L.
83-000399
Anderson, G. A.
83-000495
Anderson, R. S.
83-000496
Andersson, G.
83-000236
Andriyashev, A. P.
83-000359
Andrusak, H.
83-000487
Appel, G. O.
83-000425
Applegate, R. L.
83-000300
Appler, H. N.
83-000026
Archambault, J.
83-000248
Atkinson, J. L.
83-000033
Bachman, R. A.
83-000277
Bagenal, T. B.
83-000538
Bailey, K. M.
83-000213
Bailey, R. S.
83-000539
Bailly, Y.
83-000059
Bakanov, A. I.
83-000071
Bakun, A.
83-000266
Balayev, L. A.
83-000197
Barbannikova, I. A.
83-000100
Barcelona, M. J.
83-000022
Bargmann, G. G.
83-000490
Bartels, J. E.
83-000092
Bartlett, E. A.
83-000449
Bass, A. H.
83-000101
83-000102
Baudo, R.
83-000434
83-000442
Bauer, T. L.
83-000474
Baum, E. T.
83-000388
Baxter, J. L.
83-000540
Bayunova, N. N.
83-000100
Beall, J. T.
83-000528
Beckett, D. C.
83-000047
Bek, J. R.
83-000222
Bell, J. S.
83-000474
Bell, M. A.
83-000053
83-000054
Bello, G.
83-000329
Belova, N. V.
83-000103
Belyanina, T. N.
83-000330
Benjamin, M.
83-000171
Berg, E.
83-000256

Bern, H. A.
83-000104
Berra, T. M.
83-000214
Berry, E. S.
83-000470
Bezdenezhinykh, V. A.
83-000105
Bianco, P. G.
83-000185
Bigley, R. E.
83-000001
Bilby, R. E.
83-000435
Billings, S. J.
83-000499
Bills, T. D.
83-000043
Biro, P.
83-000354
Bisson, P. A.
83-000435
Bivin, W. M.
83-000534
Blay, J., Jr.
83-000245
Block, R. M.
83-000468
Blumm, M. C.
83-000480
Boesch, D. F.
83-000537
Bogdanov, L. V.
83-000187
Boggs, G. U.
83-000449
Bohlin, T.
83-000512
Bollman, F. H.
83-000491
Bolz, G. R.
83-000317
Borodulina, O. D.
83-000278
Boross, L.
83-000137
Bouquegneau, J.
83-000465
Braekkan, O. R.
83-000461
Breton, B.
83-000159
Brewer, G. D.
83-000246
Brind, J. L.
83-000106
Broadbent, T. D.
83-000536
Brothers, E. B.
83-000325
Brown, J. A.
83-000267
Brown, K. L.
83-000186
Brown, L. A.
83-000416
Bruce, R. W.
83-000260
Brundage, H. M. III
83-000331
Bruno, D. W.
83-000064
Bry, C.
83-000107
Buchanan, D. V.
83-000389
Buchanan, J. S.
83-000410
Buckman, M.
83-000108
Bulgakova, T. I.
83-000513
Bulkley, R. V.
83-000225
Bullock, A. M.
83-000401
83-000417
Burdak, V. D.
83-000055
Burton, D. T.
83-000202
83-000439
83-000457
83-000468
Bustamante, G.
83-000109
Buswell, J. A.
83-000391
Butler, J. L.
83-000056
Butler, P. J.
83-000177
Buynak, G. L.
83-000279
Buzuyeva, I. I.
83-000061
Caddy, J. F.
83-000514
Cairns, J., Jr.
83-000475
Cairns, M. A.
83-000450
Calentine, R. L.
83-000418
Cammen, L. M.
83-000050
Campbell, A. C.
83-000391
Carey, C. L.
83-000344
Carl, L. M.
83-000247
Carle, K. J.
83-000280
Carline, R. F.
83-000238
Carlisle, J. C.
83-000415

Carneiro, N. M.
83-000110
Carson, D. O.
83-000421
Caspers, H.
83-000332
Catrow, V. J.
83-000006
Cech, J. J., Jr.
83-000309
Central Luzon State University Freshwater Aquaculture Center
83-000011
83-000012
Cetta, F.
83-000111
Chagny, F.
83-000128
Chang, J. P.
83-000112
Chekunova, V. I.
83-000281
Cheng, T. C.
83-000447
Chereshnev, I. A.
83-000363
Cherfas, N. B.
83-000189
Christensen, B. M.
83-000418
Chupakhin, V. M.
83-000241
Churikova, N. I.
83-000135
Chusid, M. J.
83-000400
Cipriano, R. C.
83-000392
Clady, M. D.
83-000198
Clark, F. N.
83-000541
Clark, M. J. R.
83-000448
Clarke, T. A.
83-000282
Cole, G. J.
83-000113
Colgan, P. W.
83-000267
Colin, D. A.
83-000156
Collett, B. B.
83-000360
Collinson, R. I.
83-000224
Combs, D. L.
83-000488
Condrey, R. E.
83-000114
Cone, D. K.
83-000393
Confer, J. L.
83-000436
Conover, D. O.
83-000230
Conroy, D. A.
83-000384
83-000398
Conti, F. C.
83-000329
Cook, A. F.
83-000112
Copland, J. W.
83-000402
Corey, P. D.
83-000310
Cote, Y.
83-000232
Courtenay, W. R., Jr.
83-000333
Courtney, W. A. M.
83-000131
Cowey, C. B.
83-000027
Coyer, J. A.
83-000305
Coyne, K. M.
83-000203
Cravedi, J.
83-000115
Crawshaw, L. I.
83-000146
Crim, L. W.
83-000013
Croker, R. S.
83-000542
Csirke, J.
83-000514
Cuenco, M. L.
83-000515
Cummings, L. C.
83-000022
D'yakov, Y. P.
83-000187
Dabrowski, K.
83-000028
Dahm, E.
83-000538
Danil'chenko, O. P.
83-000116
Dannevig, B. H.
83-000117
Darling, D. S.
83-000118
Dasgupta, J. D.
83-000057
Dasmahapatra, A. K.
83-000119
Davies, W. D.
83-000516
Davis, K. B.
83-000451
Dawson, C. E.
83-000361
Dawson, M. A.
83-000452

De Lopez, N.
83-000398
de Nie, H. W.
83-000283
De Smet, W. M. A.
83-000058
Deacon, J. E.
83-000333
Dean, J. C.
83-000029
83-000120
Dean, J. M.
83-000087
Deardorff, T. L.
83-000419
Deegan, L. A.
83-000349
Delventhal, H.
83-000016
Dempster, L. J.
83-000369
Denoncourt, R. F.
83-000215
Densen, W. L. T. van
83-000355
83-000508
Desowitz, R. S.
83-000419
DeVries, A. L.
83-000121
Devries, A. L.
83-000157
Dickhoff, W. W.
83-000118
Dingyuan, D.
83-000216
Divert, G. M.
83-000122
Dizon, A. E.
83-000023
Doherty, P. J.
83-000199
Domanevskaya, M. V.
83-000334
Donald, D. B.
83-000496
Dorofeeva, E. A.
83-000068
Dorofeyeva, Y. A.
83-000188
Dorr, H.
83-000292
Dorr, J. A. III
83-000217
Dosanjh, B. S.
83-000031
Downey, P. C.
83-000005
Drozzhina, K. S.
83-000288
Dumont, P.
83-000248
Dunel-Erb, S.
83-000059
Duplinsky, P. D.
83-000123
Durve, V. S.
83-000462
Dykova, I.
83-000403
Eastcott, A.
83-000212
Easter, S. S., Jr.
83-000201
Economidis, P. S.
83-000381
Eddy, F. B.
83-000453
Efimov, Y. N.
83-000513
Efremenko, V. N.
83-000249
Ekau, W.
83-000218
Elazhary, M. A. S. Y.
83-000413
Ellis, A. E.
83-000064
Elovenko, V. N.
83-000192
Enderlein, O.
83-000284
83-000285
Engle, C. R.
83-000030
Engle, F. V.
83-000006
English, M. J.
83-000310
Ermolin, V. P.
83-000286
Ernst, M. E.
83-000311
Evans, D. H.
83-000140
Evans, D. M.
83-000013
Evans, M. S.
83-000356
Evans, R. D.
83-000437
Ewing, R. D.
83-000108
Eyeson, K. N.
83-000245
Fabacher, D. L.
83-000124
83-000454
Fagerholm, H.-P.
83-000420
Fagerlund, U. H. M.
83-000031
Fairchild, G. W.
83-000287
Fallis, B. W.
83-000438
Fange, R.
83-000086

FAO of the UN
83-000312
83-000481
83-000482
83-000518
83-000543
83-000544
83-000545
83-000546
83-000547
83-000555
Farrell, M. P.
83-000190
Fastenau, H. S.
83-000022
Fava, J. A.
83-000351
Fedorova, G. V.
83-000288
Felton, S. P.
83-000458
Fernald, R. D.
83-000060
Fernando, C. H.
83-000231
Filyushina, Y. Y.
83-000061
Fischthal, J. H.
83-000421
Flerova, G. I.
83-000205
Fletcher, G. L.
83-000455
Floryak, V. S.
83-000135
Forbes, A. M.
83-000519
Ford, B. S.
83-000489
Foureman, G. L.
83-000456
Fraidenburg, M. E.
83-000490
Francis, R. C.
83-000213
Fraser, J. E.
83-000453
Fremont, L.
83-000125
Fryer, J. L.
83-000389
Fryer, J. N.
83-000126
Fulcher, A. S.
83-000062
Fus, H. J.
83-000008
Gabriel, W. L.
83-000268
Gagnon, P. S.
83-000191
Galanti, G.
83-000434

...CONTINUED...
Galanti, G.
83-000442
Garrett, G. P.
83-000250
Gaumert, T.
83-000527
Gavrenkov, Y. I.
83-000135
83-000251
Gayet, M.
83-000362
Geevarghese, C.
83-000063
George-Nascimento F., M.
83-000422
George, C. J.
83-000064
Gerking, S. D.
83-000138
Gerstung, E.
83-000483
Gibson, R. J.
83-000232
Gillespie, J. H.
83-000415
Gilliam, W. T.
83-000467
Gleason, E. V.
83-000219
Glubokovskiy, M. K.
83-000363
Glukhov, A. A.
83-000200
Godbout, R.
83-000353
Goetz, F. W.
83-000111
Goldstein, S.
83-000104
Golovnev, L. N.
83-000127
Gomel'skii, B. I.
83-000189
Gorbach, E. I.
83-000252
Gorbman, A.
83-000118
Gorelova, T. A.
83-000289
Goren, M.
83-000364
Graham, T. E.
83-000399
Gras, J.
83-000128
Graves, W. C.
83-000439
83-000457
Grechanov, I. G.
83-000129
Greeff, N. G.
83-000096
Green, A. W.
83-000272

Gritsenko, O. F.
83-000335
Groberg, W. J., Jr.
83-000412
Gropp, J.
83-000032
Gruber, D.
83-000336
83-000475
Gudefin, Y.
83-000128
Guest, W. C.
83-000039
Gum, R. L.
83-000491
Gunther, R.
83-000104
Gurzynski, A. J.
83-000279
Guttman, S. I.
83-000190
Gydemo, R.
83-000374
Habib, G.
83-000344
Hadderingh, R. H.
83-000508
Hageman, G. S.
83-000056
Haglund, T. R.
83-000053
Haines, T. A.
83-000441
Hairston, N. G., Jr.
83-000201
Hall, L. W., Jr.
83-000202
83-000439
83-000457
Halsey, T. G.
83-000500
Hama, K.
83-000069
Hamackova, J.
83-000083
Hamann, M. I.
83-000385
Hamman, R. L.
83-000014
83-000015
Hammar, J.
83-000374
Hannah, J. B.
83-000458
Hanneman, W. R.
83-000327
Haoming, H.
83-000216
Hardiman, P. A.
83-000168
Hardy, G. S.
83-000365
Harlan, C. W.
83-000474
Harrington, J. P.
83-000130
Harris, H. J.
83-000519
Harris, J. E.
83-000155
Harris, L. E.
83-000040
Harrison, P. G.
83-000001
Hartig, J. H.
83-000356
Hassler, T. J.
83-000290
Hastings, P. A.
83-000280
Haswell, M. S.
83-000040
Hatfield, J. S.
83-000190
Haux, C.
83-000133
Hawke, J. P.
83-000025
Hawkins, A. D.
83-000172
Hazel, J. R.
83-000138
Heckman, C. W.
83-000332
Heinrich, J. W.
83-000504
Helfrich, L. A.
83-000029
Helvey, M.
83-000253
Heming, T. A.
83-000291
Henderson, B. A.
83-000233
Hendrix, S. D.
83-000023
Hetrick, F. M.
83-000457
Hewitt, R. P.
83-000234
Higgins, P. J.
83-000176
Higgs, D. A.
83-000031
Hilge, V.
83-000016
Hill, R. L.
83-000412
Hilsenhoff, W. L.
83-000440
Hiltibran, R. C.
83-000459
Hilton, J. W.
83-000033
Hilton, L. R.
83-000020
Hirji, K. N.
83-000131

Hislop, J. R. G.
83-000492
Ho, J.
83-000423
Hoffmann, R.
83-000132
Hokama, Y.
83-000463
Holcik, J.
83-000231
Holloway, H. L., Jr.
83-000411
Holmgren, S.
83-000506
Holstein, B.
83-000133
Holt, J.
83-000353
Holt, S.
83-000353
Homgren, S.
83-000505
Hopkins, C. D.
83-000101
Horder, T. J.
83-000134
Horncastle, G. S.
83-000220
Horne, A. J.
83-000003
Hose, J. E.
83-000458
Houle, C. R.
83-000037
Houser, A.
83-000535
Houston, A. H.
83-000476
Houston, C.
83-000500
Howells, G.
83-000441
Hughes, G. M.
83-000178
Huish, M. T.
83-000094
Hunter, J. R.
83-000203
83-000292
Hutchins, J. B.
83-000366
Idler, D. R.
83-000181
Il'inskikh, I. P.
83-000394
Il'inskikh, N. N.
83-000394
Iles, T. D.
83-000517
Imsand, S.
83-000337
Ince, B. W.
83-000147
Itzkowitz, M.
83-000254
Ivankov, V. N.
83-000135
Iwamoto, R. N.
83-000136
Iwaoka, W. T.
83-000458
Janssen, J.
83-000293
Jarling, C.
83-000424
Jauncey, K.
83-000026
Jenkins, R. E.
83-000371
John, P. A.
83-000063
Johnson, B. T.
83-000460
Johnson, C.
83-000008
Johnson, D. L.
83-000531
Johnson, E. Z.
83-000294
Johnson, J. H.
83-000294
83-000295
Jonas, E.
83-000137
Jones & Stokes Assoc., Inc.
83-000338
Josephson, D.
83-000269
Joswiak, G. R.
83-000065
Jude, D. J.
83-000356
83-000472
83-000509
Julshamn, K.
83-000461
Kaaret, T.
83-000436
Kaev, A. M.
83-000313
Kagawa, H.
83-000183
Kalmijn, A. J.
83-000139
Karas, P.
83-000314
Karpenko, V. I.
83-000296
Karplus, I.
83-000364
Kashkin, N. I.
83-000235
Kastelein, P.
83-000034
Kasumyan, A. O.
83-000204

Kaya, C. M.
83-000023
Kazacos, K. R.
83-000425
Kazama, T. K.
83-000023
Keck, G.
83-000444
Kelle, W.
83-000315
Kelley, S.
83-000085
Kelso, W. E.
83-000297
Kent, M. L.
83-000395
Khangarot, B. S.
83-000462
Khorevin, L. D.
83-000298
Kiceniuk, J. W.
83-000455
Kimura, H.
83-000396
Kimura, L. H.
83-000463
King, M. J.
83-000455
Kittrell, W. B.
83-000536
Klenner, W. E.
83-000438
Klets, D. V.
83-000209
Kliks, M. M.
83-000419
Klinger, H.
83-000016
Knight, R. L.
83-000299
Knights, B.
83-000035
Kondyurin, V. V.
83-000066
Koops, H.
83-000032
Koreker, D. W.
83-000438
Korf, H.-W.
83-000180
Kormanik, G. A.
83-000140
Kornfield, I.
83-000191
Korovin, V. A.
83-000041
Korovina, V. M.
83-000067
83-000068
Kosaka, T.
83-000069
Kostrov, B. P.
83-000464
Kotlyar, A. N.
83-000249
Kotrschall, K.
83-000270
Kott, E.
83-000381
Kouril, J.
83-000083
Koval', E. Z.
83-000187
Kovalevskaya, N. V.
83-000070
Kovtsova, M. V.
83-000339
Kovtun, A. A.
83-000316
Kozlov, A. N.
83-000141
83-000142
Krasnoper, Y. V.
83-000071
Kratt, L. F.
83-000076
Kraul, S.
83-000024
Krogius, F. V.
83-000357
Krska, R. J., Jr.
83-000300
Krysanov, E. Y.
83-000192
Kuiter, R. H.
83-000376
Kukuyev, Y. I.
83-000243
Kulikova, A. N.
83-000127
Kuliyev, Z. M.
83-000072
Kullander, S. O.
83-000367
Kushner, D. J.
83-000447
Kusuda, R.
83-000396
Kuusela, K.
83-000420
Kuz'mina, V. V.
83-000143
Kychanov, V. M.
83-000144
Kynard, B.
83-000510
Lagace, A.
83-000413
Lagios, M. D.
83-000368
Laitinen, M.
83-000466
Lammens, E. H. R. R.
83-000221
Landolt, M. L.
83-000458

Landsberg, D. Y.
83-000143
Lapin, V. I.
83-000145
83-000174
Lapina, N. N.
83-000145
Lasenby, D. C.
83-000437
Laskowski-Hoke, R. A.
83-000340
Laurent, P.
83-000059
Lea, R. N.
83-000369
Lee, B. J.
83-000520
Legomin, V. B.
83-000041
Leino, R. L.
83-000073
Leith, D. A.
83-000310
Lemberg, N. A.
83-000552
Lemons, D. E.
83-000146
Leont'ev, S. A.
83-000144
Letichevskiy, M. A.
83-000484
Leung, E.
83-000126
Lewis, S. V.
83-000074
Li, S.
83-000017
83-000302
Libosvarsky, J.
83-000075
Licata, A.
83-000098
Lieberman, S. H.
83-000022
Liehman, P.
83-000194
Likens, G. E.
83-000436
Lincoln, R. F.
83-000042
Lindem, T.
83-000538
Lindsey, C. C.
83-000076
Lindstrom, T.
83-000236
Lisovenko, L. A.
83-000249
Locht, B.
83-000434
83-000442
Lodge, D. M.
83-000257
Loiselle, P. V.
83-000255
Lom, J.
83-000403
Lommel, R.
83-000132
Lone, K. P.
83-000147
Lough, R. G.
83-000317
Lovell, R. T.
83-000018
Lucchetti, G. L.
83-000120
83-000237
Luescher, H. R.
83-000096
Luey, J. E.
83-000485
Luker, G. W.
83-000198
Lund, R.
83-000370
Lynch, W. E., Jr.
83-000531
MacFarlane, M. B.
83-000048
MacKenzie, K.
83-000493
MacLean, N. G.
83-000443
Madenjian, C. P.
83-000509
Maestrone, G.
83-000390
Magnhagen, C.
83-000301
Magnuson, J. J.
83-000446
83-000519
Mahnel, H.
83-000409
Maillard, C.
83-000430
Majumdar, K. C.
83-000193
Makeyeva, A. P.
83-000149
Malvestuto, S. P.
83-000516
Malyukina, G. A.
83-000205
Mandis, T. C.
83-000040
Mann, J. A.
83-000006
Mann, R.
83-000150
Manteyfel, Y. B.
83-000211
Margenau, T. L.
83-000318
Margraf, F. J.
83-000299

Margrey, S. L.
83-000439
83-000457
Marin, C.
83-000398
Marion, D.
83-000125
Markert, J. R.
83-000031
Marking, L. L.
83-000043
Markiw, M. E.
83-000387
Markofsky, J.
83-000106
Marliave, J. B.
83-000077
Marrocco, A.
83-000009
Marsh, P. C.
83-000341
83-000485
Martem"yanov, V. I.
83-000205
Martin-Robichaud, D. J.
83-000161
Martin, K. A. C.
83-000134
Martin, M. G.
83-000445
Martin, W. E.
83-000491
Massingill, M. J.
83-000309
Massoud, A. A.
83-000151
Matarese, A. C.
83-000077
Matenova, V.
83-000319
Matheson, A. T.
83-000448
Mathews, W. J.
83-000371
Mathias, J. A.
83-000017
83-000302
Matias, J. R.
83-000106
83-000152
Matlock, G. C.
83-000272
Matoja, R.
83-000465
Matsubara, J. A.
83-000153
Matthews, R. A.
83-000408
Matthews, W. J.
83-000222
Matyukhin, V. A.
83-000122
Maude, S. H.
83-000049
McAndrew, B. J.
83-000193
McBride, J. R.
83-000031
McCarter, J. A.
83-000448
McEachran, J. D.
83-000373
McEachron, J. D.
83-000372
McEvoy, A. F.
83-000548
McInerney, J. E.
83-000291
McKay, K. R.
83-000521
McKenzie, L. C.
83-000006
McLean, R. B.
83-000257
McWilliams, P. G.
83-000154
Meadows, R. E.
83-000331
Medda, A. K.
83-000119
Megahan, W. F.
83-000526
Mel'kikov, Y. S.
83-000223
Melotti, P.
83-000019
Mendoza, C. G.
83-000449
Mercy, T. V. A.
83-000078
Merrett, N. R.
83-000378
Messersmith, J. F. A.
83-000215
Methot, R. D., Jr.
83-000234
Michaletz, P. H.
83-000303
Middleton, M. J.
83-000342
Milbrink, G.
83-000505
83-000506
Millemann, R. E.
83-000477
Miller, B. S.
83-000458
Miller, D. W.
83-000036
Miller, G. L.
83-000304
Miller, M. C.
83-000047
Miller, T. J.
83-000472
Miller, W. R. III
83-000475

Minckley, W. L.
83-000341
Minshall, G. W.
83-000526
Minton, R. V.
83-000025
Mochalski, J. C.
83-000528
Modde, T.
83-000532
Moffitt, C. M.
83-000510
Mohr, H. W., Jr.
83-000279
Molin, G.
83-000358
Molnar, K.
83-000404
83-000405
Monod, G.
83-000444
Moodie, G. E. E.
83-000494
Moolenaar, R. J.
83-000449
Moore, W. S.
83-000065
Morales, J.
83-000384
Morawa, F.
83-000079
Moring, J. R.
83-000010
Morrison, J. A.
83-000539
Morrow, W. J. W.
83-000086
83-000155
Morton, J. M.
83-000528
Moser, H. G.
83-000056
83-000227
Motta, P. J.
83-000080
Moyer, J. T.
83-000258
Mudre, J. M.
83-000445
Mujica, M. E.
83-000398
Muller, K.
83-000256
83-000271
Muller, U.
83-000148
Mullin, M. M.
83-000336
Mundy, P. R.
83-000259
Munro, A. L. S.
83-000397
83-000497
Muntau, H.
83-000434
83-000442
Murdy, E. O.
83-000373
Musick, J. A.
83-000348
Myagkov, N. A.
83-000066
Nagahama, Y.
83-000183
Naiman, R. J.
83-000556
Nair, G. A.
83-000426
Nair, N. B.
83-000426
Naumov, A. G.
83-000281
Nebeker, A. V.
83-000450
Nedelec, C.
83-000501
Needham, E. A.
83-000433
Negus, M. T.
83-000502
Nero, R. W.
83-000503
Neuman, E.
83-000314
Neves, R. J.
83-000431
Nevinskiy, M. M.
83-000097
Ney, J. J.
83-000297
83-000445
Ni, I-H.
83-000081
Nielsen, J.
83-000311
Nielsen, L. A.
83-000029
Nieminen, M.
83-000466
Nishioka, R. S.
83-000104
Nonnotte, G.
83-000156
Nonnotte, L.
83-000156
Nordgren, L. E.
83-000056
Norrocky, M. J.
83-000340
North, W. J.
83-000022
Norum, K. R.
83-000117
Novak, J.
83-000320
Nyby, J.
83-000254

Nyman, L.
83-000374
O'Boyle, R.
83-000517
O'Grady, S. M.
83-000157
Oksche, A.
83-000180
Olafson, R. W.
83-000448
Olah, J.
83-000137
Oliver, M. K.
83-000521
Ono, R. D.
83-000158
Orlov, A. V.
83-000197
Osburn, H. R.
83-000272
Otis, K. J.
83-000273
Ovchinnikov, V. V.
83-000206
Overstreet, R. M.
83-000430
Padetskiy, S. N.
83-000135
Padmanabhan, K. G.
83-000078
Pankhurst, N. W.
83-000082
Paperna, I.
83-000406
Pardue, G.
83-000269
Pardue, G. B.
83-000237
Parin, N. V.
83-000343
Pariseau, R.
83-000248
Parker, N. C.
83-000451
Parrish, P. R.
83-000478
Parrish, R. H.
83-000266
Partridge, F. E.
83-000523
Pasanen, P.
83-000466
Pashchenko, N. I.
83-000204
Patterson, R. L.
83-000511
Paulencu, C. R.
83-000159
Paulin, C. D.
83-000344
Pavlov, I. D.
83-000209
Payne, A. I.
83-000224
Pearcy, W. G.
83-000226
Peck, J. W.
83-000274
Penaz, M.
83-000083
Pennington, M.
83-000317
Perdomo, C.
83-000384
Perrier, H.
83-000128
Persons, W. R.
83-000225
Peter, R. E.
83-000112
83-000159
Peters, G.
83-000160
Peterson, R. H.
83-000161
Petrova, V. G.
83-000084
Petukhov, V. B.
83-000105
Pickering, Q. H.
83-000467
Pillai, N. K.
83-000078
Pinchuk, V. I.
83-000345
83-000375
Plantikow, H.
83-000173
Platts, W. S.
83-000523
83-000524
83-000525
83-000526
Plotnikoff, M. D.
83-000031
Poddubnyy, A. G.
83-000143
Polak, J.
83-000443
Poletayev, V. A.
83-000346
Potter, I. C.
83-000074
Potthoff, T.
83-000085
Powell, A. B.
83-000321
Powell, P. P.
83-000549
Prater, B. L.
83-000340
Prentice, J. A.
83-000039
Prepas, E. E.
83-000046
83-000522
Prete, P. J.
83-000162

Price, R. L.
83-000407
Pulsford, A.
83-000086
83-000155
83-000408
Queenth, M. K. K.
83-000023
Quick, J. A., Jr.
83-000449
Rab, P.
83-000194
Rabeni, C. F.
83-000303
Radovich, J.
83-000550
Radtke, R. L.
83-000087
Ragyanszki, M.
83-000137
Rahel, F. J.
83-000446
Rainwater, W. C.
83-000535
Ramamoorthy, S.
83-000447
Randall, J. E.
83-000366
83-000376
Rankine, P. A.
83-000275
Rapport, D. J.
83-000520
Ratliff, D. E.
83-000412
Rauch, R. E.
83-000040
Raymond, J. A.
83-000157
Reeves, W. C.
83-000507
Refstie, T.
83-000045
83-000163
Regier, H. A.
83-000520
Reid, D.
83-000498
Reimer, G.
83-000164
Reinboth, R.
83-000260
Reinhard, F. G.
83-000165
Renaud, C. B.
83-000381
Reshetnikov, Y. S.
83-000067
Reynolds, W. W.
83-000270
Richards, R. H.
83-000410
Richardson, L. B.
83-000468
Riddle, L. M.
83-000399
Rideout, S. G.
83-000510
Riedel-Lorje, J. C.
83-000527
Riedl, M.
83-000132
Riessen, H. P.
83-000051
Riley, L. M.
83-000238
Ringdal, O.
83-000461
Ripatti, P.
83-000179
Rizer, R. L.
83-000106
Roberson, B. S.
83-000457
Roberts, R. J.
83-000386
Roberts, T. R.
83-000347
83-000377
Robertson, D. A.
83-000401
Robertson, D. R.
83-000260
Robotham, P. W. J.
83-000427
Roch, M.
83-000448
Roff, D. A.
83-000261
Rombout, J. H. W. M.
83-000166
Rosenberg, A. A.
83-000317
83-000322
Rosenfeld, M. E.
83-000419
Ross, M. R.
83-000230
Rottiers, D. V.
83-000167
Rubtsov, V. V.
83-000088
Rudnev, V. A.
83-000298
Ruiz, R. A.
83-000384
Rukhkyan, R. G.
83-000188
Rusiecki, M.
83-000028
Russell, T. R.
83-000303
Rychagova, T. L.
83-000169
Rychlinski, R. A.
83-000419
Saldanha, L.
83-000378

Salfert, I. G.
83-000494
Sandri, C.
83-000096
Santacana, J. A.
83-000384
83-000398
Sastry, K. V.
83-000469
Savchuk, M. Y.
83-000345
Savicheva, E. A.
83-000089
Saville, A.
83-000539
Sawyer, E. S.
83-000388
Sazonov, Y. I.
83-000379
Schell, S. A.
83-000531
Schlosser, I. J.
83-000207
Schmitt, R. J.
83-000305
Schmitz, W.
83-000208
Schnick, R. A.
83-000528
Schrag, J. D.
83-000157
Schroeder, G. L.
83-000044
Schuldt, R. J.
83-000504
Schuman, G. O.
83-000208
Schwalb-Buhling, A.
83-000032
Schwartz, E.
83-000148
Scott, A. P.
83-000042
83-000168
Scott, J. S.
83-000428
Selezneva, A. A.
83-000090
Serns, S. L.
83-000262
Severin, S. O.
83-000195
Shaklee, J. B.
83-000196
Shatunovskiy, M. I.
83-000109
Shaw, R. F.
83-000324
Shea, T. B.
83-000470
Shelton, W. L.
83-000516
Shershnev, A. P.
83-000298
Shibanov, V. N.
83-000346
Shipp, R. L.
83-000382
Shireman, J. V.
83-000002
Shmerling, M. D.
83-000061
Shparkovskiy, I. A.
83-000209
Shubina, L. I.
83-000169
Shuntov, V. P.
83-000239
83-000240
Shunyou, H.
83-000383
Siddiqui, A. A.
83-000469
Sidell, B. D.
83-000191
Sil'yanova, Z. S.
83-000263
Silim, A.
83-000413
Simakhov, Y. G.
83-000471
Simmons, M. S.
83-000472
Sinclair, M.
83-000517
Singh, S. K.
83-000469
Singh, U. N.
83-000057
Singley, P. T.
83-000257
Sire, J.
83-000170
Sivolotskaya, V. A.
83-000127
Sivtseva, L. V.
83-000091
Skinner, R. H.
83-000429
Slade, G. J.
83-000473
Slaney, P. A.
83-000323
83-000499
83-000529
Slinger, S. J.
83-000033
Small, D. A.
83-000414
Smith, C. E.
83-000411
Smith, H. A.
83-000323
83-000499
Smith, J. W.
83-000433
Smith, K. D.
83-000511

Smith, P. E.
83-000246
Smitherman, R. O.
83-000092
Sohnle, P. G.
83-000400
Solanki, T. G.
83-000171
Soofiani, N. M.
83-000172
Sorensen, E. M. B.
83-000474
Sorgeloos, P.
83-000007
Spannhof, L.
83-000173
Spanovskaya, V. D.
83-000174
Spinelli, J.
83-000037
Starliper, C. E.
83-000392
Statler, D. P.
83-000038
Stavola, A. M.
83-000468
Stein, D. L.
83-000226
Steinhagen, P.
83-000409
Stern, H.
83-000309
Stevens, E. G.
83-000227
Stevens, P. R.
83-000213
Stone, C. C.
83-000532
Stoss, J.
83-000045
Stott, F. C.
83-000228
Strange, R. J.
83-000536
Strel'bitskaya, A. A.
83-000100
Stringer, G. E.
83-000500
Strout, R. G.
83-000388
Styron, J. T., Jr.
83-000371
Sulak, K. J.
83-000348
Sullivan, K. M.
83-000175
Sumpter, J. P.
83-000168
Surat, E.
83-000222
Suttle, M. A.
83-000451
Svardson, G.
83-000358
Svetlov, M. F.
83-000343
Swanson, P. M.
83-000344
Swanson, R. J.
83-000415
Sweetman, J. A.
83-000472
Sydor, W. J.
83-000475
Talbot, C.
83-000176
Talent, L. G.
83-000306
Talhelm, D. R.
83-000519
Tamaru, C. S.
83-000196
Tatum, W. M.
83-000025
Tautz, A. F.
83-000500
Tave, D.
83-000092
Taverne-Thiele, J. J.
83-000166
Taylor, D. H.
83-000265
Taylor, E. W.
83-000177
Taylor, W. W.
83-000303
Teleki, G. C.
83-000443
Thomas, J. S.
83-000427
Thomas, S.
83-000178
Thompson, B. A.
83-000349
Thorne, R. E.
83-000552
Thorpe, G. J.
83-000040
Threader, R. W.
83-000476
Thune, R. L.
83-000399
Thurow, F.
83-000551
Tiews, K.
83-000032
Tirri, R.
83-000179
Townsend, D. W.
83-000324
Trew, D. O.
83-000046
Tricas, T. C.
83-000307
Troshicheva, N. V.
83-000209
Truchet, M.
83-000465

Trumble, R. J.
83-000552
Trunov, I. A.
83-000350
Tsai, C.
83-000351
Tseitlin, V. B.
83-000553
Tucker, R. M.
83-000167
Tulliez, J.
83-000115
Tursch, B.
83-000210
Tuunainen, P.
83-000538
Ullrich, S. O., Jr.
83-000477
Vala, J. C.
83-000430
Valtonen, E. T.
83-000420
Vanhaecke, P.
83-000007
Vari, R. P.
83-000380
Varini, P. G.
83-000434
83-000442
Vasil'kov, V. P.
83-000239
83-000240
Vaught, R. S.
83-000421
Veilleux, P.
83-000095
Venogradova, V. M.
83-000211
Vergara R., L.
83-000422
Veshchev, P. V.
83-000486
Vickery, B. H.
83-000013
Victor, B. C.
83-000325
Vigh-Teichmann, I.
83-000180
Vigh, B.
83-000180
Vijverberg, J.
83-000355
Villiers, L.
83-000326
Vincent, C. L.
83-000052
Vincent, W. F.
83-000052
Visser, M.
83-000308
Vladykov, V. D.
83-000381
Volodin, V. M.
83-000129

...CONTINUED...
Volodin, V. M.
83-000264
Voros, L.
83-000354
Voss, G. J.
83-000344
Walker, J. A.
83-000050
Wallace, R. A.
83-000257
Walsh, M.
83-000275
Waples, R. S.
83-000196
Warburton, K.
83-000229
Ward, B. R.
83-000529
Ward, G. S.
83-000478
Waters, T. F.
83-000048
Weber, D. A.
83-000530
Weber, J. J.
83-000273
Wegner, N.
83-000093
Wei, Z.
83-000383
Wekell, J. C.
83-000037
Wicker, A. M.
83-000094
Widlak, J.
83-000431
Wiederholm, A. M.
83-000301
Wiegand, M. D.
83-000181
Wiener, J. G.
83-000327
Williams, D. D.
83-000049
Williams, E. H., Jr.
83-000432
Williams, J. T.
83-000382
Wilson, J. L.
83-000020
Wilson, M. V. H.
83-000095
Wilson, R. R., Jr.
83-000328
Winemiller, K. O.
83-000265
Wissing, T. E.
83-000190
Wohlgemuth, E.
83-000083
Wohlschlag, D. E.
83-000353
Wolf, K.
83-000387

Woo, N. Y. S.
83-000182
Woolcott, W. S.
83-000062
Wooten, R.
83-000433
Wootton, R. J.
83-000099
Wright, D. E.
83-000212
Wu, R. S. S.
83-000182
Wurtsbaugh, W. A.
83-000003
Yasargil, G. M.
83-000096
Yasinskaya, L. N.
83-000127
Yefanov, V. N.
83-000241
Yefremenko, V. N.
83-000352
Yevseyenko, S. A.
83-000097
Yezierska, B.
83-000138
Yiyu, C.
83-000383
Yogo, Y.
83-000258
Yoshiyama, R. M.
83-000353
Young, G.
83-000183
Youngson, A.
83-000027
Yuling, Z.
83-000216
Zaccone, G.
83-000098
Zaferman, M. L.
83-000200
Zaki Mokhamed, M. I.
83-000149
Zaporozhets, O. M.
83-000197
Zenzerov, V. S.
83-000184
Zerunian, S.
83-000021
Zieman, J. C.
83-000554
Zinn, J. L.
83-000389
Zinov'yev, Y. A.
83-000195
Zitko, V.
83-000479
Zybin, A. S.
83-000041

Adriatic Sea
83-000329
Africa
83-000224
Africa: Lake Malawi
83-000521
Africa: Lake Victoria
83-000518
Alabama
83-000432
Alaska: Yukon River
83-000259
Antarctica
83-000359
Arctic Ocean
83-000438
Argentina
83-000218
83-000385
Arizona: Phoenix
83-000341
Arkansas: Beaver Lake
83-000535
Asia
83-000347
83-000377
Atlantic Ocean, East Central
83-000543
83-000547
Atlantic Ocean, North
83-000079
83-000081
83-000097
83-000150
83-000235
83-000256
83-000275
83-000284
83-000285
83-000346
83-000348
83-000428
83-000497
83-000539
83-000544
Atlantic Ocean, North: Georges Bank
83-000317
Atlantic Ocean, South
83-000228
83-000242
83-000350
Atlantic Ocean, Southwestern
83-000249
Atlantic Ocean, West Central
83-000546
Australia
83-000373
Australia: New South Wales
83-000342
Australia: Victoria: Tambo River
83-000214
Barents Sea
83-000339

...CONTINUED...
Barents Sea
83-000346
Bering Sea
83-000187
California
83-000022
83-000338
83-000483
83-000540
83-000541
83-000542
83-000548
83-000549
83-000550
California: Elkhorn Slough
83-000306
California: Holcomb Creek
83-000054
Canada, Western
83-000046
Canada: British Columbia
83-000489
83-000500
Canada: British Columbia: Campbell River
83-000448
Canada: British Columbia: Keogh River
83-000323
83-000499
83-000529
Canada: British Columbia: Kootenay Bay
83-000437
Canada: British Columbia: Kootenay Lake
83-000487
Canada: British Columbia: Vancouver Island: Somass River
83-000220
Canada: Ontario: Lake Mantou
83-000233
Canada: Ontario: Lake Opinicon
83-000267
Canada: Ontario: Nanticoke Thermal Generating Station
83-000443
Canada: Quebec: David Lake
83-000248
Canada: Quebec: St. Lawrence River
83-000232
Canada: Scotian Shelf
83-000428
Canada: Yukon
83-000076
Caribbean Sea
83-000109
Caspian Sea
83-000072
Central America
83-000481
China: Lake Lugu
83-000383
China: Tumen River
83-000216
Colorado
83-000530

Connecticut River
83-000510
Cuba
83-000244
Czechoslovakia
83-000320
Delaware: Delaware River Estuary
83-000331
Denmark
83-000311
Egypt: Lake Qarun
83-000533
Europe
83-000482
Europe, Northern
83-000374
Falkland Islands
83-000228
Finland
83-000420
Finland: Lake Konnevesi
83-000538
Florida
83-000429
83-000554
Florida: Orange Cty.: Lake Baldwin
83-000002
Georgia: Lake Nottely
83-000536
Ghana
83-000245
Great Lakes
83-000520
Greece
83-000381
Gulf of Elat
83-000364
Gulf of Mexico
83-000272
83-000353
Hawaii
83-000282
Hungary: Lake Balaton
83-000354
Idaho: South Fork Salmon River
83-000523
Illinois: Clinton Cty.: Carlyle Lake
83-000407
Illinois: Vermilion Cty.: Jordan Creek
83-000207
Indian Ocean
83-000223
83-000330
Italy
83-000019
83-000185
Kentucky
83-000418
Lake Erie
83-000238
83-000498
83-000511
Lake Erie: Nanticoke Thermal Generating Station
83-000443
Lake Michigan
83-000217
83-000356
Lake Michigan: Green Bay
83-000519
Lake Superior
83-000274
Louisiana
83-000349
83-000537
Massachussets: Essex Bay
83-000230
Mediterranean Sea
83-000270
83-000334
83-000545
Mexico
83-000382
Michigan
83-000247
Minnesota
83-000048
Mississippi River
83-000528
Mississippi: Tombigbee River
83-000304
Netherlands
83-000355
Netherlands: Lake Bergumermeer
83-000508
Netherlands: Lake Tjeukemeer
83-000221
83-000283
Nevada
83-000333
Nevada: Lake Mead
83-000491
New York
83-000325
New York: Orwell Brook
83-000295
New York: Trucka Brook
83-000294
New Zealand
83-000344
83-000365
New Zealand: Lake Vanda
83-000052
Nigeria: Lake Kainji
83-000276
North Sea
83-000079
83-000275
Ohio River
83-000047
Ohio: Butler Cty.: Indian Creek
83-000265
Ohio: Portage River
83-000340
Oklahoma: Neosho River
83-000488
Oregon
83-000226

...CONTINUED...

Oregon
83-000322
Oregon: Imnaha River
83-000495
Oregon: Lostine River
83-000495
Oregon: Wallowa River
83-000495
Pacific Ocean
83-000001
83-000174
83-000218
83-000226
83-000239
83-000240
83-000246
83-000266
83-000268
83-000282
83-000289
83-000322
83-000337
83-000376
83-000379
83-000419
83-000423
83-000550
Pacific Ocean, North: Strait of Georgia
83-000552
Pacific Ocean: California
83-000338
Pacific Ocean: Southern California Bight
83-000336
Paraguay
83-000380
Paraguay: La Plata Basin
83-000367
Pennsylvania: York Cty.: Cordorus Creek
83-000215
Red Sea
83-000364
Scotland
83-000386
South America
83-000360
South Dakota
83-000300
83-000532
Sweden
83-000236
83-000256
83-000358
Switzerland: Lake Geneva
83-000444
Tennessee: Watts Bar Reservoir
83-000257
Texas
83-000272
83-000353
Texas: Camp Cty.: Ferndale Lake
83-000162
United Kingdom
83-000497
United States, Northeastern
83-000510
USSR
83-000149
83-000241
83-000251
83-000345
USSR: Iturup Island
83-000313
USSR: Krivaya River
83-000135
USSR: Lake Dalnee
83-000357
USSR: Lake Ladoga
83-000288
USSR: Ob River
83-000195
USSR: Rybinsk Reservoir
83-000129
83-000264
USSR: Sakhalin
83-000316
USSR: Sakhalin Island
83-000298
USSR: Volga River
83-000484
83-000486
Utah: Lake Powell
83-000225
Virginia
83-000237
83-000269
83-000348
Virginia: Claytor Lake
83-000297
Virginia: North Fork Holston River
83-000431
Virginia: Roanoke River
83-000222
West Germany
Elbe Estuary
83-000424
West Germany: Elbe Basin
83-000332
West Germany: Elbe River
83-000527
West Indies
83-000430
Wisconsin
83-000327
83-000446
Wisconsin: Lake Winnebago
83-000273
Wisconsin: Vilas Cty.: Escanaba Lake
83-000262

Abramis brama
Age/Growth
83-000319
Fecundity
83-000264
Life History/General
83-000221
Maturation
83-000145
Reproduction
83-000145
Reproductive System
83-000129
Abudefduf leucogaster
Defensive Behavior
83-000210
Acanthogobius flavimanus
Distribution/Factors of
83-000342
Distribution/Geographical
83-000342
Acipenser guldenstadti
Dredging
83-000486
Acipenser oxyrhynchus
Distribution/Geographical
83-000331
Acipenseridae
Endocrinology
83-000100
Agonus vulsus
Taxonomy
83-000369
Albula
Electrophoresis
83-000196
Evolution
83-000196
Speciation
83-000196
Albula vulpes
Distribution/Geographical
83-000349
Alburnus albidus X Leuciscus cephalus cabeda
Hybridization
83-000185
Alosa aestivalis
Culture/Propagation
83-000039
Foods/Feeding/Selectivity
83-000293
Predator/Prey Relationships
83-000293
Transportation
83-000039
Alosa caspia caspia
Lipid Metabolism
83-000169
Metabolism
83-000169
Alosa sapidissima
Fish Passage
83-000510

...CONTINUED...
Alosa sapidissima
Management/Research--Rivers and Streams
83-000510
Restoration of Anadromous Runs
83-000510
Alvordius
Skeletal System
83-000062
Ammodytes marinus
Life History/General
83-000229
Anguilla
Bibliographies
83-000555
Anguilla anguilla
Cadmium
83-000465
Culture/Propagation
83-000034
83-000035
Diets
83-000034
Digestive System
83-000160
Feeding Experiments
83-000034
83-000035
Feeds
83-000035
Foods/Feeding
83-000283
Heavy Metals
83-000465
Integument
83-000082
Myxobolus dermatobia
83-000402
Parasites/Diseases
83-000402
Protozoan Diseases
83-000402
Reproduction
83-000105
Stress
83-000160
Anoploma fimbria
Bioenergetics
83-000175
Apistogramma ramirezi
Euclinostomum heterostomum
83-000425
Parasites/Diseases
83-000425
Trematodes
83-000425
Aplocheilus lineatus
Acoustico-Lateralis System
83-000148
Aplodinotis grunniens
Abundance/Factors of
83-000511
Aplodinotus grunniens
Fish Passage
83-000511

...CONTINUED...
Aplodinotus grunniens
Impingement/Entrainment
83-000511
Power Plants
83-000511
Arctica islandica
Reproductive System
83-000150
Aristichthys nobilis
Cage Culture
83-000030
Culture/Propagation
83-000030
Feeding Experiments
83-000030
Sperm
83-000103
Ascelichthys rhodorus
Early Development
83-000077
Barbus conchonius
Endocrinology
83-000166
Bathylagus antarctius
Distribution/Geographical
83-000352
Eggs
83-000352
Blennius pholis
Chloride Cells
83-000156
Osmoregulation
83-000156
Blicca bjoerkna
Maturation
83-000145
Parasites/Diseases
83-000409
Reproduction
83-000145
Rhabdovirus Disease
83-000409
Viral Diseases
83-000409
Bothidae
Spawning
83-000249
Brachydanio rerio
Embryology
83-000057
Brevoortia tyrannus
Chlorine
83-000439
Pollution Avoidance
83-000439
Power Plant Effluents
83-000439
Brycon melanopterus
Digestive System
83-000164
Enzymes
83-000164
Cantherhines fronticinctus
Taxonomy
83-000366
Cantherhines longicaudus
New Species
83-000366
Caranx ruber
Biochemical Composition
83-000109
Carassius auratus
Bioassay Techniques
83-000476
Catecholamines
83-000112
Cortisol
83-000126
Culture/Propagation
83-000019
Endocrinology
83-000112
83-000126
83-000159
Goldfish Virus
83-000470
Insecticides
83-000470
Olfaction
83-000069
Parasites/Diseases
83-000470
Reproductive System
83-000159
Sodium Chloride
83-000476
Toxaphene
83-000470
Viral Diseases
83-000470
Vision
83-000134
Carassius carassius
Aeromonas punctata
83-000394
Bacterial Diseases
83-000394
Parasites/Diseases
83-000394
Carcharhinus
Identification
83-000375
Catostomus commersoni
Cestodes
83-000421
Digestive System
83-000073
Glaridacris laruei
83-000421
Parasites/Diseases
83-000421
Rodlet Cells
83-000073
Cephaloscylium ventriosum
Ampullary System
83-000307
Electroreception
83-000307

...CONTINUED...
Cephaloscylium ventriosum
Foods/Feeding
83-000307
Chacidae
Taxonomy
83-000377
Chaetodon miliaris
Mouth Parts
83-000080
Channa punctatus
Heavy Metals
83-000462
Insecticides
83-000469
Nickel
83-000462
Organophosphates
83-000469
Quinalphos
83-000469
Zinc
83-000462
Channa striatus
Alitropus typus
83-000426
Parasites/Diseases
83-000426
Parasitic Isopods
83-000426
Chondrenchelys problematica
Paleontology
83-000370
Cichlasoma cyanoguttatum
Spawning
83-000254
Clupea harengus
Age/Growth
83-000317
Competition
83-000284
Foods/Feeding/Selectivity
83-000284
Clupea harengus harengus
Fish Stocks
83-000191
Life History/General
83-000539
Management/Research--Marine
83-000539
Variation Studies
83-000191
Clupea harengus pallasi
Management/Research--Marine
83-000552
Cobitis taenia
Allocreadium transversale
83-000427
Parasites/Diseases
83-000427
Trematodes
83-000427
Colisa labiosa
Auditory Senses
83-000093
Colossoma mitrei
Parasites/Diseases
83-000385
Coregonus albula
Competition
83-000284
Foods/Feeding
83-000285
Foods/Feeding/Selectivity
83-000284
Coregonus sardinella
Morphology
83-000076
Coris aurilineata
New Species
83-000376
Coris bulbifrons
New Species
83-000376
Coris pictoides
New Species
83-000376
Coryphaenoides acrolepis
Age/Growth
83-000328
Crenicichla lepidota
Taxonomy
83-000367
Crenimugil labrosus
Learning
83-000212
Myxobolus exiguus
83-000408
Parasites/Diseases
83-000408
Protozoan Diseases
83-000408
Ctenopharyngodon idella
Alarm Reaction
83-000204
Aquatic Plant Control
83-000002
Defensive Behavior
83-000204
Olfaction
83-000204
Pheromones
83-000204
Sperm
83-000103
Curimatopsis myersi
New Species
83-000380
Cyclothone microdon
Biochemical Composition
83-000174
Reproduction
83-000174
Cyprinodon macularius californiensis
Spawning
83-000255
Cyprinodon pecosensis
Reproduction
83-000250

Cyprinus carpio
Blood Chemistry
83-000127
Culture/Propagation
83-000011
83-000012
Digestive System
83-000137
Eggs
83-000088
Enzymes
83-000137
Learning
83-000212
Movements
83-000273
Parasites/Diseases
83-000403
83-000405
Protozoan Diseases
83-000403
83-000405
Sperm
83-000103
Sphaerospora renicola
83-000403
Thelohanellus nikolskii
83-000405
Deltentosteus quadrimaculatus
Digestion Rates
83-000326
Foods/Feeding
83-000326
Dicentrarchus labrax
Blood Chemistry
83-000178
Hypoxia
83-000178
Dorosoma cepedianum
Abundance/Factors of
83-000511
Electrophoresis
83-000190
Fish Passage
83-000511
Impingement/Entrainment
83-000511
Parasites/Diseases
83-000407
Pleistophora cepedianae
83-000407
Power Plants
83-000511
Protozoan Diseases
83-000407
Dorosoma petenense
Spawning
83-000257
Echiodon dawsoni
New Species
83-000382
Eigenmannia
Electric Organs
83-000153
Elasmobranchii
Electroreception
83-000139
Eleginus gracilis
Antifreeze Production
83-000157
Elops saurus
Distribution/Geographical
83-000349
Embiotoca
Foods/Feeding/Selectivity
83-000305
Engraulis mordax
Abundance/Factors of
83-000239
Foods/Feeding
83-000292
Mortality Rates
83-000234
Movements
83-000234
Population Studies
83-000239
Schooling Behavior
83-000203
Spawning
83-000246
Epinephelus akaara
Osmoregulation
83-000182
Salinity
83-000182
Ericosma
Skeletal System
83-000062
Erimyzon sucetta
Cestodes
83-000418
Parasites/Diseases
83-000418
Penarchigetes macrorchis
83-000418
Esocidae
Management/Research--Reservoirs
83-000534
Esox americanus
Nervous System
83-000158
Esox lucius
Biomagnification
83-000434
Heavy Metals
83-000434
Sperm
83-000123
Temperature
83-000290
Esox masquinongy
Foods/Feeding
83-000300
Esox niger
Nervous System
83-000158

...CONTINUED...
Esox niger
Sperm
83-000094
83-000123
Esox reicherti
Fecundity
83-000252
Etheostoma flabellare
Competition
83-000222
Ecology
83-000222
Foods/Feeding
83-000222
Habitat Selection
83-000222
Etheostoma podostemone
Competition
83-000222
Ecology
83-000222
Foods/Feeding
83-000222
Habitat Selection
83-000222
Ethmalosa fimbriata
Fecundity
83-000245
Reproduction
83-000245
Spawning
83-000245
Eudontomyzon hellenicus
New Species
83-000381
Fowleria abocellata
New Species
83-000364
Fundulus heteroclitus
Otoliths
83-000087
Gadus morhua
Amino Acids
83-000133
Digestive System
83-000133
Heavy Metals
83-000461
Mercury
83-000461
Metabolic Rates
83-000172
Gadus ogac
Antifreeze Production
83-000157
Gambusia affinis
Movements
83-000186
Population Genetics
83-000186
Gasterosteus aculeatus
Age/Growth
83-000099

...CONTINUED...
Gasterosteus aculeatus
Coloration
83-000054
Foods/Feeding/Selectivity
83-000308
Predator/Prey Relationships
83-000308
Gasterosteus doryssus
Paleontology
83-000053
Variation Studies
83-000053
Geotria australis
Cardio-Vascular System
83-000074
Gills
83-000074
Gila cypha
Culture/Propagation
83-000015
Induced Maturation
83-000015
Gila elegans
Culture/Propagation
83-000014
Induced Maturation
83-000014
Gillichthys mirabilis
Caudal Neurosecretory System
83-000104
Glyptocephalus cynoglossus
Parasites/Diseases
83-000428
Trematodes
83-000428
Gobio uranoscopus
Meristic Studies
83-000075
Gobionellus boleosonia
Foods/Feeding/Selectivity
83-000280
Gonostoma
Foods/Feeding
83-000289
Gymnarchus niloticus
Electrophysiology
83-000101
Nervous System
83-000101
Halichoeres melanochir
Spawning Behavior
83-000258
Haplochromis burtoni
Vision
83-000060
Harpagofututor volsellorhinus
Paleontology
83-000370
Hemichromis bimaculatus
Regeneration
83-000170
Scales
83-000170

Heteropneustes fossilis
Endocrinology
83-000119
Hippocampus ramulosus
Integument
83-000098
Hippoglossoides platessoides
Parasites/Diseases
83-000428
Trematodes
83-000428
Hirundichthys marginatus
Early Development
83-000070
Embryology
83-000070
Horaglanis krishnai
Reproductive System
83-000078
Hucho hucho
Karyotypes
83-000194
Hypophthalmichthys molitrix
Digestive System
83-000137
Enzymes
83-000137
Sperm
83-000103
Hypsoblennius gentilis
Life History/General
83-000227
Hypsoblennius jenkinsi
Life History/General
83-000227
Ictalurus punctatus
Aeromonas hydrophila
83-000399
Bacterial Diseases
83-000399
Culture/Propagation
83-000016
83-000018
83-000020
83-000029
Endocrinology
83-000151
Feeding Experiments
83-000029
Feeds
83-000029
Parasites/Diseases
83-000399
Polyculture
83-000020
Stress
83-000016
Taste and Ordor Problems
83-000018
Water Quality
83-000016
Ilyophis blachei
New Species
83-000378
Istigobius hoesei
New Species
83-000373
Katsuwonus pelamis
Culture/Propagation
83-000023
Egg Production
83-000023
Latimeria
Taxonomy
83-000368
Leiostomus xanthurus
Oil
83-000473
Oil Disperants
83-000473
Lepisosteus
Olfaction
83-000113
Lepomis
Distribution/Vertical
83-000267
Lepomis macrochirus
Age/Growth
83-000327
Condition Factors
83-000327
Foods/Feeding/Selectivity
83-000293
Insecticides
83-000459
pH
83-000162
83-000327
Predator/Prey Relationships
83-000293
Sperm
83-000094
Vision
83-000201
Leuciscus brandti
Life History/General
83-000216
Limanda ferruginea
Distribution/Factors of
83-000097
Early Development
83-000097
Embryology
83-000097
Movements
83-000097
Parasites/Diseases
83-000428
Trematodes
83-000428
Lutjanus campechanus
Culture/Propagation
83-000025
Induced Maturation
83-000025
Luvaris imperialis
Distribution/Geographical
83-000344

Macrouridae
Life History/General
83-000226
Mallotus villosus socialis
Embryology
83-000089
Mallotus villosus villosus
Endocrinology
83-000184
Masturus lanceolatus
Distribution/Geographical
83-000344
Menidia menidia
Age/Growth
83-000230
Population Studies
83-000230
Production
83-000230
Temperature Selection
83-000202
Year Class Strength
83-000230
Merluccius hubbsi
Life History/General
83-000228
Merluccius productus
Life History/General
83-000213
Microgadus tomcod
Antifreeze Production
83-000157
Micrognathus
Taxonomy
83-000361
Micrognathus natans
New Species
83-000361
Micromesistius australis
Life History/General
83-000228
Micromesistius poutassou
Age/Growth
83-000324
Micropterus dolomieui
Competition
83-000297
Foods/Feeding/Selectivity
83-000297
Spawning
83-000265
Micropterus punctulatus
Competition
83-000198
83-000297
Foods/Feeding
83-000198
Foods/Feeding/Selectivity
83-000297
Micropterus salmoides
Abundance/Factors of
83-000516
Age/Growth
83-000532

...CONTINUED...
Micropterus salmoides
Competition
83-000198
Foods/Feeding
83-000198
83-000287
Management/Research--Ponds
83-000532
pH
83-000162
Predator/Prey Relationships
83-000287
83-000516
Stocking/Introductions
83-000532
Temperature
83-000146
Misgurnus fossilis
Mercuric Chloride
83-000464
Radionuclides
83-000464
Mobula japanica
Distribution/Geographical
83-000344
Morone americana
Ozone-Produced Oxidents
83-000468
Treatment Plant Effluents
83-000468
Morone chrysops
Abundance/Factors of
83-000511
Fish Passage
83-000511
Hybridization
83-000219
Impingement/Entrainment
83-000511
Life History/General
83-000219
Management/Research--General
83-000219
Power Plants
83-000511
Stocking/Introductions
83-000219
Morone saxatilis
Anesthetics
83-000451
Chlorine
83-000457
Foods/Feeding
83-000225
Heavy Metals
83-000452
Hybridization
83-000219
Life History/General
83-000219
Management/Research--General
83-000219
Mercury
83-000452

...CONTINUED...
Morone saxatilis
Spawning
83-000225
Stocking/Introductions
83-000219
Transportation
83-000451
Mugil cephalus
Baitfish Culture
83-000024
Culture/Propagation
83-000024
Mugil curema
Fecundity
83-000244
Mugil hospes
Fecundity
83-000244
Mugil liza
Fecundity
83-000244
Mugil trichodon
Fecundity
83-000244
Mullus barbatus ponticus
Magnetic Field
83-000197
Mustelus californicus
Foods/Feeding
83-000306
Mustelus henlei
Foods/Feeding
83-000306
Mylio macrocephalus
Osmoregulation
83-000182
Salinity
83-000182
Myliobatis californica
Foods/Feeding
83-000306
Nothobranchius guentheri
Embryology
83-000152
Lipid Composition
83-000106
Reproduction
83-000152
Notothenia gibberifrons
Age/Growth
83-000315
Biochemical Composition
83-000142
Notothenia ramsayi
Life History/General
83-000218
Notothenia rossi marmorata
Foods/Feeding
83-000281
Lipid Metabolism
83-000141
Protein Synthesis
83-000141
Nototheniidae
Fecundity
83-000263
Notropis analostanus
Age/Growth
83-000215
Spawning
83-000215
Noturus munitus
Foods/Feeding/Selectivity
83-000304
Trophic Relationships
83-000304
Oligolepis acutipennis
Embryology
83-000063
Oncorhynchus
Blood Chemistry
83-000130
Grazing
83-000524
83-000525
Riparian Habitat
83-000524
83-000525
Oncorhynchus gorbuscha
Amino Acids
83-000209
Distribution/Geographical
83-000498
Fish Stocks
83-000335
Foods/Feeding
83-000296
Orientation/Homing
83-000209
Population Studies
83-000241
Predator/Prey Relationships
83-000298
Spawning Migration
83-000209
Stocking/Introductions
83-000498
Oncorhynchus keta
Age/Growth
83-000313
83-000316
Culture/Propagation
83-000008
Foods/Feeding
83-000296
Fry Producton
83-000008
Incubators
83-000008
Oncorhynchus kisutch
Age/Growth
83-000136
83-000310
Culture/Propagation
83-000031
83-000310

...CONTINUED...
Oncorhynchus kisutch
Diets
83-000031
Endocrinology
83-000118
Feeding Experiments
83-000031
Genetic Strains
83-000136
Hormones
83-000118
Light
83-000136
Osmoregulation
83-000136
Parr-Smolt Transformation
83-000136
Spawning
83-000247
Stream Impoundment/General
83-000529
Temperature
83-000136
83-000310
Turbidity
83-000435
Oncorhynchus masou
Meristic Studies
83-000135
Reproduction
83-000135
Oncorhynchus nerka
Abundance/Factors of
83-000357
Population Studies
83-000357
Year Class Strength
83-000357
Oncorhynchus rhodurus
Reproduction
83-000183
Oncorhynchus tshawytscha
ATP
83-000108
Culture/Propagation
83-000010
Fin Erosion
83-000010
Foods/Feeding
83-000291
Injuries
83-000010
Management/Research--Rivers and Streams
83-000523
Net-Pen Culture
83-000010
Parasites/Diseases
83-000010
Population Studies
83-000523
Spawning
83-000247

...CONTINUED...
Oncorhynchus tshawytscha
Spawning Migration
83-000259
Temperature
83-000291
Opisthoproctus soleatus
Reproduction
83-000243
Spawning
83-000243
Opsanus beta
Osmoregulation
83-000140
Orthodon microlepidotus
Age/Growth
83-000309
Osmerus eperlanus
Competition
83-000284
Foods/Feeding/Selectivity
83-000284
Helminths
83-000424
Parasites/Diseases
83-000424
Ostraciidae
Haliotrema
83-000430
Parasites/Diseases
83-000430
Trematodes
83-000430
Pagellus acarne
Distribution/Geographical
83-000334
Paralabrax clathratus
Early Development
83-000056
Embryology
83-000056
Paralabrax maculatofasciatus
Early Development
83-000056
Embryology
83-000056
Paralabrax nebulifer
Early Development
83-000056
Embryology
83-000056
Paralichthys dentatus
Age/Growth
83-000321
Paraliparis copei gibbericeps
New Subspecies
83-000359
Paraliparis meganchus
New Species
83-000359
Parophrys vetulus
Age/Growth
83-000322
Perca flavescens
Abundance/Factors of
83-000217

...CONTINUED...
Perca flavescens
Digestive System
83-000073
Life History/General
83-000217
Rodlet Cells
83-000073
Sperm
83-000094
Perca fluviatilis
Age/Growth
83-000314
Cardio-Vascular System
83-000179
Digestive System
83-000131
Enzymes
83-000131
Foods/Feeding
83-000288
Thermal Pollution
83-000314
Perccottus glehni
Karyotypes
83-000192
Percidae
Management/Research--Reservoirs
83-000534
Percina ouachitae
Foods/Feeding/Selectivity
83-000304
Trophic Relationships
83-000304
Percina roanoka
Competition
83-000222
Ecology
83-000222
Foods/Feeding
83-000222
Habitat Selection
83-000222
Skeletal System
83-000062
Percina sciera
Foods/Feeding/Selectivity
83-000304
Trophic Relationships
83-000304
Petromyzon marinus
Fishing Gear
83-000504
Phoxinus eos
Hybridization
83-000065
Meristic Studies
83-000065
Variation Studies
83-000065
Phoxinus erythrogaster
Hybridization
83-000065
Meristic Studies
83-000065

...CONTINUED...
Phoxinus erythrogaster
Variation Studies
83-000065
Phoxinus phoxinus
Pineal Body
83-000180
Pimelodus maculatus
Endocrinology
83-000110
Pimephales promelas
Acenaphthene
83-000450
Aldicarb
83-000467
Bromide
83-000449
Fonofos
83-000467
Insecticides
83-000467
Isophorone
83-000450
Pleuronectes platessa
Distribution/Geographical
83-000339
Ichtyobodo necator
83-000401
Movements
83-000339
Parasites/Diseases
83-000401
Protozoan Diseases
83-000401
Pleuronectiformes
Maturation
83-000261
Reproduction
83-000261
Poecilla reticulata
Communication
83-000211
Olfaction
83-000211
Polyodon spathula
Age/Growth
83-000303
Exploitation Rates
83-000488
Foods/Feeding
83-000303
Polyprion americanus
Behavior
83-000200
Polypterus
Excretory System
83-000058
Pomacentrus flavicauda
Competition
83-000199
Pomacentrus wardi
Competition
83-000199
Pomatoschistus
Distribution/Geographical
83-000345

Pomatoschistus microps
Foods/Feeding/Selectivity
83-000301
Potamorrhaphis
Taxonomy
83-000360
Prosopium cylindraceum
Digestive System
83-000067
Protopterus
Aestivation
83-000165
Enzymes
83-000165
Prototractes maraena
Life History/General
83-000214
Psettodes erumei
Distribution/Geographical
83-000223
Distribution/Vertical
83-000223
Life History/General
83-000223
Pseudopleuronectes americanus
Enzymes
83-000456
Oil
83-000455
Parasites/Diseases
83-000428
Polycyclic Aromatic Hydrocarbons
83-000456
Trematodes
83-000428
Pseudorasbora parva
Embryology
83-000149
Reproduction
83-000149
Pseudorhombus arsius
Distribution/Geographical
83-000223
Distribution/Vertical
83-000223
Life History/General
83-000223
Pseudorhombus javanicus
Distribution/Geographical
83-000223
Distribution/Vertical
83-000223
Life History/General
83-000223
Psychrolutes
Parasites/Diseases
83-000423
Parasitic Copepods
83-000423
Pterygotrigla pauli
New Species
83-000365
Pungitius pungitius
Mucous Cells
83-000171

...CONTINUED...
Pungitius pungitius
Mucous Secretion
83-000171
Osmoregulation
83-000171
Raja erinacea
Enzymes
83-000456
Polycyclic Aromatic Hydrocarbons
83-000456
Raja lintea
Distribution/Geographical
83-000346
Ramallichthys
New Genus
83-000362
Paleontology
83-000362
Regalecidae
Distribution/Geographical
83-000350
Reinhardtius hippoglossoides
Polymorphism
83-000187
Rhinichthys atratulus
Foods/Feeding
83-000295
Foods/Feeding/Selectivity
83-000294
Taxonomy
83-000371
Rhinobatos productus
Foods/Feeding
83-000306
Rhynchohyalus natalensis
Reproduction
83-000243
Spawning
83-000243
Rutilus rubilio
Culture/Propagation
83-000021
Life History/General
83-000021
Rutilus rutilus
Age/Growth
83-000314
Maturation
83-000145
Reproduction
83-000145
Thermal Pollution
83-000314
Salmo aguabonita
Management/Research--General
83-000483
Salmo alpinus
Blood Chemistry
83-000117
Lipid Metabolism
83-000117
Salmo gairdneri
Abdominal Pores
83-000064

...CONTINUED...
Salmo gairdneri
Age/Growth
83-000120
Alkanes
83-000115
Amino Acids
83-000128
Bacterial Diseases
83-000387
83-000389
83-000393
Benzene
83-000471
Benzo(a)pyrene
83-000458
Blood Chemistry
83-000125
Caligus elongatus
83-000433
Carbohydrate Metabolism
83-000173
Cardio-Vascular System
83-000128
Carotenoids
83-000091
Ceratomyxa shasta
83-000389
Cortisol
83-000107
Culture/Propagation
83-000009
83-000027
83-000032
83-000033
83-000037
83-000038
83-000040
83-000042
Diets
83-000033
83-000037
Digestive System
83-000173
Distribution/Geographical
83-000329
Endocrinology
83-000107
83-000168
Enzymes
83-000120
Feeders
83-000038
Feeding Experiments
83-000027
83-000032
83-000033
83-000037
Feeds
83-000027
83-000032
Fungal Diseases
83-000400
Genetic Strains
83-000009

...CONTINUED...
Salmo gairdneri
Harvest
83-000489
Heavy Metals
83-000453
Ichthyophthiriasis
83-000387
Ichthyophthirius multifiliis
83-000387
IHN
83-000412
Immunization
83-000387
Lactobacillus
83-000393
Lepeophtheirus salmonis
83-000433
Life History/General
83-000220
Lipid Composition
83-000125
Lipid Metabolism
83-000115
83-000138
83-000181
Management/Research--Lakes
83-000496
Management/Research--Rivers and Streams
83-000523
Maturation
83-000416
Mucous Secretion
83-000453
Nutrition
83-000032
83-000147
Parasites/Diseases
83-000387
83-000389
83-000393
83-000400
83-000412
83-000416
83-000433
Parasitic Copepods
83-000433
Pigments
83-000091
Population Studies
83-000523
Put-Grow-and-Take
83-000496
Reproduction
83-000168
Reproductive System
83-000416
Respiratory System
83-000128
Saprolegnia
83-000400
Sex Reversal
83-000042

...CONTINUED...
Salmo gairdneri
Starvation
83-000138
Steroids
83-000147
Stocking/Introductions
83-000496
Stream Impoundment/General
83-000529
Transportation
83-000040
Triploid Fish
83-000042
Unisex Populations
83-000042
Viral Diseases
83-000412
Vitamins
83-000027
Zinc
83-000453
Salmo ischchan
Karyotypes
83-000188
Variation Studies
83-000188
Salmo ischchan gegarkuni
Digestive System
83-000068
Salmo salar
Aeromonas salmonicida
83-000392
Amino Acids
83-000209
Bacterial Diseases
83-000388
83-000392
Culture/Propagation
83-000013
83-000045
Fish Passage
83-000510
Furunculosis
83-000392
Gall Bladder
83-000176
Gamete Storage
83-000045
Growth Stimulants
83-000163
Hormones
83-000163
Immunization
83-000388
83-000392
Management/Research--Rivers and Streams
83-000510
Maturation
83-000416
Movements
83-000232
Orientation/Homing
83-000209

...CONTINUED...
Salmo salar
Osmoregulation
83-000163
Parasites/Diseases
83-000388
83-000392
83-000416
pH
83-000161
Population Studies
83-000232
Production
83-000232
Reproductive System
83-000416
Restoration of Anadromous Runs
83-000510
Spawning Cycle Regulation
83-000013
Spawning Migration
83-000209
Vibrio anguillarum
83-000388
Salmo trutta
Calcium
83-000154
Culture/Propagation
83-000045
Foods/Feeding
83-000277
Gamete Storage
83-000045
Movements
83-000269
Salmonidae
Acidification
83-000236
IPN
83-000413
Management/Research--Reservoirs
83-000534
Parasites/Diseases
83-000413
Population Studies
83-000236
Viral Diseases
83-000413
Salvelinus
Taxonomy
83-000363
Salvelinus alpinus
Life History/General
83-000374
Taxonomy
83-000374
Salvelinus fontinalis
Aeromonas salmonicida
83-000392
Anesthetics
83-000454
Bacterial Diseases
83-000392
Culture/Propagation
83-000111

...CONTINUED...
Salvelinus fontinalis
Endocrinology
83-000111
Excretory System
83-000124
83-000454
Foods/Feeding/Selectivity
83-000294
Furunculosis
83-000392
Immunization
83-000392
Induced Maturation
83-000111
IPN
83-000415
MS-222
83-000454
Parasites/Diseases
83-000392
83-000415
Population Studies
83-000237
Production
83-000237
Quinaldine
83-000454
Reproduction
83-000111
Viral Diseases
83-000415
Salvelinus fontinalis X S. namaycush
Anesthetics
83-000466
MS-222
83-000466
Salvelinus malma
Age/Growth
83-000323
Habitat Selection
83-000323
Management/Research--Rivers and Streams
83-000523
Mortality Rates
83-000323
Population Studies
83-000523
Salvelinus namaycush
Distribution/Vertical
83-000274
Mangement/Research--Lakes
83-000233
Population Studies
83-000233
Spawning
83-000248
Stocking/Introductions
83-000233
Sardinops sagax
Management/Research--Marine
83-000550
Population Studies
83-000240
...CONTINUED...
Sardinops sagax
Spawning
83-000246
Sarotherodon galilaeus
Foods/Feeding
83-000276
pH
83-000276
Saurida
Electrophoresis
83-000196
Evolution
83-000196
Speciation
83-000196
Scardinius erythrophthalmus
Age/Growth
83-000320
Production
83-000320
Schizostedion marinum
Life History/General
83-000072
Meristic Studies
83-000072
Schizothorax
Speciation
83-000383
Taxonomy
83-000383
Schroederichthys chilensis
Nematodes
83-000422
Parasites/Diseases
83-000422
Proleptus acutus
83-000422
Sciaenops ocellatus
Movements
83-000272
Scomber scombrus
Movements
83-000275
Scombridae
Spawning
83-000242
Scopelosaurus hamiltoni
Distribution/Geographical
83-000343
Scyliorhinus canicula
Cardio-Vascular System
83-000177
Immune Response
83-000155
Nervous System
83-000177
Spleen
83-000086
Sebastes
Spawning
83-000253
Sebastes fasciatus
Variation Studies
83-000081

Sebastes mentella
Variation Studies
83-000081
Semotilus atromaculatus
Foods/Feeding/Selectivity
83-000294
Semotilus corporalis
Age/Growth
83-000325
Semotilus margarita
Distribution/Geographical
83-000351
Foods/Feeding/Selectivity
83-000294
Habitat Selection
83-000351
Seriola
Bacterial Diseases
83-000396
Parasites/Diseases
83-000396
Streptococcus
83-000396
Silurus glanis
Digestive System
83-000137
Enzymes
83-000137
Solea solea
Bacterial Diseases
83-000391
Black Patch Necrosis
83-000391
Parasites/Diseases
83-000391
Sparisomatinae
Reproduction
83-000260
Sex Reversal
83-000260
Sparus aurata
Kudoa
83-000406
Parasites/Diseases
83-000406
Protozoan Diseases
83-000406
Sprattus sprattus
Meristic Studies
83-000079
Skeletal System
83-000079
Squalus acanthias
Meristic Studies
83-000066
Variation Studies
83-000066
Squalus fernandinus
Meristic Studies
83-000066
Variation Studies
83-000066
Stenodus leucichthys
Artificial Spawning Beds
83-000484

...CONTINUED...
Stenodus leucichthys
Blood Chemistry
83-000144
Sternopygus
Electric Organs
83-000153
Stizostedion canadense
Life History/General
83-000531
Mangement/Research--Ponds
83-000531
Stizostedion lucioperca
Abundance/Factors of
83-000355
Foods/Feeding
83-000288
Predator/Prey Relationships
83-000355
Stizostedion vitreum vitreum
Abundance/Factors of
83-000511
Age/Growth
83-000318
Culture/Propagation
83-000017
Fecundity
83-000262
Fish Passage
83-000511
Fish Stocks
83-000238
Foods/Feeding
83-000302
Foods/Feeding/Selectivity
83-000279
Impingement/Entrainment
83-000511
Life History/General
83-000531
Management/Research--Ponds
83-000531
Mortality Factors
83-000017
Mortality Rates
83-000262
Myopathy
83-000411
Parasites/Diseases
83-000411
Power Plants
83-000511
Scales
83-000238
Tumors
83-000411
Stomateidae
Foods/Feeding
83-000282
Sympterygia
Taxonomy
83-000372
Synodus
Electrophoresis
83-000196

...CONTINUED...
Synodus
Evolution
83-000196
Speciation
83-000196
Talismania brachycephala
New Species
83-000379
Thunnus albacares
Foods/Feeding
83-000278
Thymallus
Habitat Selection
83-000208
Temperature
83-000208
Thymallus arcticus
Karyotypes
83-000195
Thymallus arcticus baicalensis
Musculature
83-000061
83-000122
Stress
83-000061
Thymallus thymallus
Age/Growth
83-000311
Cystidicoloides ephemeridarum
83-000420
Nematodes
83-000420
Parasites/Diseases
83-000420
Tilapia
Culture/Propagation
83-000011
83-000012
83-000020
Electrophoresis
83-000193
Fish Stocks
83-000193
Polyculture
83-000020
Tilapia aurea
Abnormalities
83-000092
Life History/General
83-000224
Tilapia nilotica
Abnormalities
83-000092
Culture/Propagation
83-000026
Feeding Experiments
83-000026
Feeds
83-000026
Life History/General
83-000224
Tinca tinca
Early Development
83-000083
...CONTINUED...
Tinca tinca
Eimeria
83-000404
Nervous System
83-000096
Parasites/Diseases
83-000404
83-000409
Protozoan Diseases
83-000404
Rhabdovirus Disease
83-000409
Viral Diseases
83-000409
Tribolodon brandti
Spawning
83-000251
Tribolodon hakonensis
Spawning
83-000251
Trichogaster trichopterus
Acid-fast Bacteria
83-000398
Bacterial Diseases
83-000398
Parasites/Diseases
83-000398
Triphoturus
Distribution/Geographical
83-000337
Umbridae
Skeletal System
83-000095
Wallago
Distribution/Geographical
83-000347
Taxonomy
83-000347
Xiphias gladius
Early Development
83-000085

U.S. GOVERNMENT PRINTING OFFICE:1983-676-081/5

SUBSCRIPTION INFORMATION

For current subscription price contact:

Superintendent of Documents
U.S. Government Printing Office
Washington, DC 20402

U.S. Federal Agencies in wildlife-related fields and individuals or agencies who exchange domestic or foreign publications may receive free subscription to *Sport Fishery Abstracts* by writing to:

Editorial Office—*Sport Fishery Abstracts*
U.S. Fish and Wildlife Service
270 Aylesworth Hall, CSU
Fort Collins, CO 80523

CHANGE OF ADDRESS

If SFA is the first entry on the first line of your address label, send your new address and your former address *exactly* as it appears on your mailing label to:

The Government Printing Office
Superintendent of Documents
Washington, DC 20402

If a 5-digit number appears as the first line of the label, send your new address and your former address *exactly* as it appears on your mailing label to:

Editorial Office—*Sport Fishery Abstracts*
U.S. Fish and Wildlife Service
270 Aylesworth Hall, CSU
Fort Collins, CO 80523

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interests of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
EDITORIAL OFFICE
AYLESWORTH HALL, CSU
FORT COLLINS, COLORADO 80523

PRESORTED
SPECIAL FOURTH-CLASS RATE
POSTAGE & FEES PAID
USDI
PERMIT No. G-77